

In the United States Court of Federal Claims

Nos. 14-167C & 14-168C

(E-filed: July 12, 2023)¹

GEORGIA POWER COMPANY and
ALABAMA POWER COMPANY,

Plaintiffs,

v.

THE UNITED STATES,

Defendant.

Alan T. Rogers, Birmingham, AL, for plaintiffs. Adam K. Israel and Sloane B. Phillips, of counsel.

Borislav Kushnir, Trial Attorney, with whom appeared Brian M. Boynton, Acting Assistant Attorney General, Patricia M. McCarthy, Director, and Lisa L. Donahue, Assistant Director, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, DC, for defendant. Jimmy S. McBirney, Margaret J. Jantzen, Kelly A. Krystyniak, and John M. McAdams, of counsel. Jane K. Taylor, United States Department of Energy, of counsel.

OPINION AND ORDER

CAMPBELL-SMITH, Judge.

Plaintiffs Georgia Power Company and Alabama Power Company filed the instant complaints on March 4, 2014, alleging that defendant partially breached its contractual

¹ This opinion was issued under seal on June 14, 2023. The parties were invited to identify source selection, proprietary or confidential material subject to deletion on the basis that the material was protected/privileged. No redactions were proposed by the parties. Thus, the sealed and public versions of this opinion are identical, except for the publication date and this footnote.

obligations related to the removal of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) from plaintiffs' facilities.² See Georgia Power Co. v. United States, Case No. 14-167C, ECF No. 1 (complaint for Plant Alvin W. Vogtle (Plant Vogtle) and Plant Edwin I. Hatch (Plant Hatch)); Alabama Power Co. v. United States, Case No. 14-168C, ECF No. 1 (complaint for Plant John M. Farley, Units 1 & 2 (Plant Farley)). The court conducted a trial on damages in these cases from February 18, 2020, through March 6, 2020.³ See ECF Nos. 162, 163, 164, 165, 167, 168, 169, 170, 171, 173, 174, 175, 176, 177 (trial transcripts (Tr.)).

Presently before the court are the following post-trial briefs: (1) defendant's post-trial brief, ECF No. 223; (2) plaintiffs' post-trial brief, ECF No. 224; (3) defendant's response, ECF No. 229; (4) plaintiffs' response, ECF No. 230; (5) defendant's reply, ECF No. 231; and (6) plaintiffs' reply, ECF No. 232.

The court has considered all of the evidence and the parties' arguments and now addresses the issues that are pertinent to the court's ruling in this opinion. Based on the evidence presented at trial, and for the following reasons, the court finds that plaintiffs are entitled to recover damages incurred as a result of defendant's partial breach.

I. Background and Findings of Fact

A. The Standard Contracts

Defendant entered into nearly identical Standard Contracts with each of the utilities in these cases, under which the government, through the Department of Energy (DOE), agreed to dispose of the utilities' SNF.⁴ See ECF No. 224 at 12 (plaintiffs noting

² Each of plaintiffs' complaints included a claim for breach of the implied duty of good faith and fair dealing in addition to a claim for partial breach of contract. See Georgia Power Co. v. United States, Case No. 14-167C, ECF No. 1 (complaint for Plant Alvin W. Vogtle (Plant Vogtle) and Plant Edwin I. Hatch (Plant Hatch)); Alabama Power Co. v. United States, Case No. 14-168C, ECF No. 1 (complaint for Plant John M. Farley, Units 1 & 2 (Plant Farley)). The court's review of the dockets did not reveal any substantive discussion of these claims, and thus, the court deems plaintiffs' claims for breach of the implied duty of good faith and fair dealing to be abandoned.

³ All electronic case filings referenced in this opinion and order appear on the Georgia Power Co. v. United States, Case No. 14-167C docket unless otherwise stated. The court notes that these cases were consolidated for purposes of discovery and trial. See ECF No. 23 (order granting request to consolidate).

⁴ In Southern Nuclear Operating Co. v. United States, 77 Fed. Cl. 396 (2007), aff'd in part, vacated in part, 637 F.3d 1297 (2011), the court wrote extensively on the contracts between the utilities and the government, the historical context in which the contracts came about, and the

that the standard contracts were “identical”). The provisions at issue here define the plaintiffs’ responsibilities to prepare the fuel for transportation, and the government’s responsibilities to provide certain equipment and information to facilitate transportation of the casks.

The plaintiffs are obligated, in relevant part, to “arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of SNF and/or HLW to the DOE facility.”⁵ JX 1 at IV.A.2 (Preparation for Transportation). In addition, the Standard Contract requires that plaintiffs “accurately classify SNF and/or HLW prior to delivery in accordance with paragraphs B and D of Appendix E.” JX 1 at VI.A.1.b (Criteria for Disposal). Paragraphs B and D of Appendix E, in turn, provide guidance for characterizing fuel as “standard,” “nonstandard,” or “failed.” JX 1 at Appendix E (General Specifications). As relevant here, Appendix E specifies that failed fuel be: (1) “visually inspected for evidence of structural deformity or damage;” and (2) “packaged and placed in casks so that all applicable regulatory requirements are met.” *Id.* at B.6.a, c (Failed Fuel).

The government’s obligations, in relevant part, are as follows:

DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser’s site to the DOE facility. Such cask(s) shall be furnished sufficiently in advance to accommodate scheduled deliveries. Such cask(s) shall be suitable for use at the Purchaser’s site, meet applicable regulatory requirements, and be accompanied by pertinent information including, but not limited to, the following:

- (a) written procedures for cask handling and loading, including specifications on Purchaser-furnished cannisters [sic] for containment of failed fuel;
- (b) training for Purchaser’s personnel in cask handling and loading, as may be necessary;
- (c) technical information, special tools, equipment, lifting trunnions, spare parts and consumables needed to use and perform incidental maintenance on the cask(s), and

intricacies of spent nuclear fuel processes. In the interest of focusing on the new issues before the court, that discussion is not repeated in this opinion.

⁵ There are four contracts at issue in this case—two for Plant Hatch, one for Plant Vogtle, and one for Plant Farley. *See* ECF No. 141 at 2. The court will cite to JX 1 in referring to contract language because the material portions of the contracts are identical. *See* JX 1, JX 2, JX 3, and JX 4.

(d) sufficient documentation on the equipment supplied by DOE.

JX 1 at IV.B.2 (DOE Responsibilities).

B. Litigation History

Plaintiffs initially filed suit in this court in 1998, alleging the government's breach of its contractual obligations related to the removal of spent nuclear fuel from plaintiffs' facilities. See S. Nuclear Operating Co. v. United States, No. 98-614C (Fed. Cl. filed July 29, 1998). In that first round of litigation, the court granted summary judgment on liability in favor of plaintiffs. See id. at ECF No. 234.

The parties went to trial on the issue of damages, and after detailed consideration of plaintiffs' claims, the court concluded that:

The contracts have been breached by a series of delays that now continue into 2017 and perhaps 2018. As a result, plaintiffs have built dry storage and reracked . . . mitigating efforts that would not have been necessary if DOE had commenced performance at any reasonable pickup rate.

S. Nuclear Operating Co. v. United States, 77 Fed. Cl. 396, 459 (2007). On appeal, the United States Court of Appeals for the Federal Circuit affirmed the court's ruling "that the government had partially breached the Standard Contract by failing to begin accepting SNF in January 1998," and noted "[t]here is no issue on appeal as to liability; liability in these SNF cases has been established." S. Nuclear Operating Co. v. United States, 637 F.3d 1297, 1299 (Fed. Cir. 2011) (affirming in part and reversing in part the court's damages award). Following the Federal Circuit's remand, the parties settled the remaining damages issues, and stipulated to a judgment, which the court entered on April 5, 2012. See S. Nuclear, No. 98-614C, ECF No. 423 (order entering final judgment).

Plaintiffs filed a second round of litigation on April 3, 2008, seeking to recover damages accrued from January 1, 2005, through December 31, 2010. See Alabama Power Co. v. United States, 119 Fed. Cl. 615, 618 (2014). Because the government's partial breach had already been established, plaintiffs had the task of proving the amount of their alleged damages and establishing that those damages flowed from the government's breach. See id. Following a trial, the court awarded damages to Georgia Power Company in an amount of \$36,474,408 and damages to Alabama Power Company in an amount of \$26,492,773. See id.

Plaintiffs filed their third round of litigation, in the cases presently before the court, on March 4, 2014. See ECF No. 1. The parties have agreed that plaintiffs incurred the damages at issue in these cases from January 1, 2011, through December 31, 2014.

See ECF No. 17 at 1 (joint status report stating the parties' stipulation to the damages period).

C. Damages at Issue

Plaintiffs in this case seek damages in a total amount of \$177,571,872. See ECF No. 224 at 12. On July 3, 2019, the court granted summary judgment in an amount of \$31,193,958 in favor of Alabama Power (for Plant Farley), and in an amount of \$111,959,799 in favor of Georgia Power (\$43,973,607 for Plant Hatch and \$67,986,192 for Plant Vogtle). See ECF No. 92 at 9 (July 3, 2019 opinion reported at Georgia Power Co. v. United States, 143 Fed. Cl. 750, 757 (2019)); ECF No. 224 at 12. Prior to trial, the parties agreed upon an additional \$4,995,671 in damages, including \$1,630,725 for Alabama Power (Plant Farley) and \$3,364,946 for Georgia Power (\$1,697,614 for Plant Hatch and \$1,667,332 for Plant Vogtle). See ECF No. 224; see also ECF No. 170 at 109 (Tr. 1766:3-1768:13). Thus, the total amount of undisputed damages is \$148,149,428.

The remaining sum of plaintiffs' alleged damages that was disputed at trial is \$29,422,444.61, including: (1) \$5,190,836.77 claimed by Alabama Power in connection with Plant Farley; (2) \$24,231,607.84 claimed by Georgia Power in connection with Plant Hatch (\$91,875.18) and Plant Vogtle (\$24,139,732.66).⁶ See ECF No. 224 at 13. Of that amount, the parties have stipulated that plaintiffs incurred \$21,408,993.90. See ECF No. 141-1. In addition, defendant contends that plaintiffs have improperly allocated—and thus should not recover—\$455,518. See ECF No. 229 at 109.

Defendant seeks offsets against damages owed to plaintiffs in an amount of \$3,345,106 for the rate of return on common equity earned by plaintiffs. See ECF No. 223 at 7 (citing ECF No. 174 at 209 (Tr. 2532:10-15 (Cain)); ECF No. 178-65 at 3 (DDX Q at 3)).

D. Plant Hatch

On June 10, 1983, the government entered into a contract with Georgia Power with regard to the disposal of fuel from Plant Hatch. See ECF No. 141 at 1 (joint

⁶ In its opening post-trial brief, defendant states that the amount in dispute is \$29,452,189, see ECF No. 223 at 6, which amounts to \$29,745 more than plaintiffs allege is in dispute, see ECF No. 224 at 13. The record citations included as support for defendant's figure suggest that the number was derived from the testimony of Mr. Kenneth Metcalfe, plaintiffs' damages expert. See ECF No. 169 at 266-67 (Tr. 1635:7-1640:5 (Metcalfe)). In this section of testimony, it appears that Mr. Metcalfe includes \$29,745 relating to defendant's claim of improper indirect cost allocation, see ECF No. 178-24 at 9 (PDX Y) which does not match the presently claimed amount of \$455,518, see ECF No. 229 at 109. To avoid confusion, the court addresses the alleged improper allocations separately from plaintiffs' claim.

stipulations of fact).⁷ In this phase of litigation, Georgia Power seeks damages that it alleges were incurred at Plant Hatch, due to the government's partial breach of the Standard Contract from January 1, 2011, through December 31, 2014. See ECF No. 17 at 1; ECF No. 141 at 2.

During that time, Georgia Power repaired its Holtec mating device that is used during Plant Hatch loading campaigns. See ECF No. 224 at 35; see also ECF No. 141 at 2; ECF No. 141-1. The Holtec "mating device is a piece of equipment that facilitates the transfer of the [multi-purpose canister (MPC)] from the HI-TRAC into the HI-STORM." Id. at 36 (citing ECF No. 163 at 23 (Tr. 237:6-9 (Channell))). To accomplish this, the mating device sits between the HI-STORM overpack and the HI-TRAC transfer cask. See id. (citing ECF No. 163 at 23 (Tr. 237:18-21 (Channell))).

While conducting a practice loading campaign at Plant Hatch, Georgia Power discovered that the mating device was too narrow, and as a result, did not fit properly on the HI-TRAC casks. See ECF No. 163 at 174 (Tr. 388:4-21 (Channell)). According to Mr. Clay Channell, plaintiffs' Dry Storage Program Manager, the improper fit was a manufacturing error made by Holtec. See id. at 175 (Tr. 389:18-22 (Channell)). Georgia Power hired Bechtel Power Corporation and Williams Plant Services to fix the problem by grinding down the sides of the mating device to the correct size. See id. (Tr. 389:1-17 (Channell)).

The repairs to the mating device cost \$52,014.44. See ECF No. 141-1. Georgia Power did not seek to recover the costs from Holtec. See ECF No. 163 at 177 (Tr. 391:2-7 (Channell)).

E. Plant Vogtle

On June 10, 1983, the government entered into a contract with Georgia Power with regard to the disposal of fuel from Plant Vogtle. See ECF No. 141 at 1. In this phase of litigation, Georgia Power seeks damages that cover costs it alleges were incurred, due to the government's partial breach of the Standard Contract from January 1, 2011, through December 31, 2014. See ECF No. 17 at 1; ECF No. 141 at 2.

During that time, Georgia Power incurred costs related to Plant Vogtle's dry cask storage program including modifications to the fuel handling building, overhead cask handling crane, sally port, 2014 fuel sipping campaign, and dry storage engineering. See ECF No. 224 at 55-140. Georgia Power's alleged damages for these categories are as follows:

⁷ Two contracts were executed for Plant Hatch. See ECF No. 141 at 1.

Fuel Handling Building Modifications:	\$6,318,677.40
Overhead Cask Handling Crane:	\$5,703,010.27
Sally Port:	\$7,242,557.29
2014 Fuel Sipping Campaign:	\$805,873.50
Dry Storage Engineering:	\$1,741,478.00
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Total:	\$21,811,596.46

See ECF No. 224 at 26. The court will address the pertinent facts for each category, in turn.

1. Equipment for and Modifications to Fuel Handling Building

Georgia Power made a series of modifications to the Fuel Handling Building at Plant Vogtle during the damages period at issue in this case, including to the: (1) cask loading pit pedestal; (2) cask loading pit seismic restraint system; (3) cask loading pit temporary walkway; (4) cask washdown area pedestal; (5) cask washdown area seismic restraints; (6) cask washdown area scaffolding staircase; (7) cask washdown area step-over grating; (8) cask washdown area work platform; (9) cask washdown area electrical receptacles; (10) lift yoke stand; (11) lift yoke storage arm; (12) concrete pad outside fuel handling building; (13) small bore piping for helium in fuel handling building; (14) cask washdown area demineralized water system; (15) boron concentration analysis; and (16) removable cask loading pit lights. See ECF No. 224 at 55-92.

In the cask loading pit, Georgia Power loads spent fuel from the spent fuel pool into HI-TRAC transfer casks and, from there, moves the fuel to HI-STORM dry storage casks. See ECF No. 164 at 127-28 (Tr. 646:19-647:9 (Cash)); ECF No. 165 at 59 (Tr. 721:3-13 (Cash)). The HI-TRAC transfer cask was custom-designed for Plant Vogtle. See ECF No. 165 at 65, 66-67, 72-73 (Tr. 727:2-4, 728:10-729:1, 734:25-735:5 (Cash)). During the loading process, the HI-TRAC transfer casks sit on a custom-designed pedestal in the cask loading pit to ensure that the casks are at the appropriate height. See id. at 58, 59, 60 (Tr. 720:5-24, 721:21-23, 722:1-9 (Cash)); see also ECF No. 168 at 99 (Tr. 1284:6-15 (Supko)). The design of the pedestal was made to specifically match the design of the HI-TRAC casks. See id. at 100-01 (Tr. 1285:3-1286:5 (Supko)). The pedestal cost \$275,000. See ECF No. 141-1 (“Cask Loading Pit Pedestal”). Alternatives to purchasing the pedestal were available to Plant Vogtle, but would have been more expensive solutions. See ECF No. 170 at 153-54 (Tr. 1810:9-1811:14 (Loftin)).

Plant Vogtle also purchased a seismic restraint system for the cask loading pit because the plant is in an “active seismic zone,” and it is “part of [the plant’s] process” to evaluate all equipment for earthquake safety. ECF No. 164 at 129 (Tr. 648:13-15 (Cash)); ECF No. 165 at 69 (Tr. 731:6-16 (Cash)). Like the pedestal, the seismic restraint system was custom-designed for the HI-TRAC casks at Plant Vogtle. See ECF

No. 165 at 71-73 (Tr. 733:25-735:12 (Cash)). Plaintiffs noted, however, that “the restraints were not because of the HI-TRAC,” and “any cask that you’re putting on a pedestal [at Plant Vogtle] is going to require some sort of seismic restraint.” *Id.* at 182 (Tr. 844:15-25 (Cash)). The seismic restraints cost \$1,346,127.75. *See* ECF No. 141-1 (“[Cask Loading Pit] HI-TRAC Seismic Restraint System”).

Georgia Power also seeks damages for the costs related to designing and building a temporary walkway over the cask loading pit. *See* ECF No. 224 at 62. In 2009, Georgia Power determined that the DOE would fail to collect spent nuclear fuel before on-site storage was necessary, and began making plans for dry storage. *See* ECF No. 165 at 227-30 (Tr. 889-92 (Cash)). It was critical that Plant Vogtle complete preparations for dry storage before the presence of excess spent fuel created operational complications, including interruptions in electricity generation. *See id.* Due to the time-sensitive nature of the work, Georgia Power moved on “parallel paths on some parts of the project and contingency plans.” ECF No. 224 at 64 (citing ECF No. 168 at 105-08 (Tr. 1290-93 (Supko))). The cask loading pit temporary walkway was one such contingency plan to guard against the risk that “the tool used for moving spent fuel rods from the pool into the MPC might not reach the cask if the cask pedestal being designed and built by Holtec was a little on the short side.” *Id.* (citing ECF No. 165 at 83-84 (Tr. 745-46 (Cash))). The temporary walkway “would have assured that [workers] had the reach they needed for the tool used for loading.” *Id.* (citing ECF No. 165 at 84-85 (Tr. 746:13-747:5 (Cash))). Georgia Power anticipated that designing and building the walkway would require eight weeks. *See* ECF No. 165 at 84-85 (Tr. 746:13-747:5 (Cash)); *see also id.* at 184-85 (Tr. 846:14-847:8 (Cash)) (stating that if accurate drawings had been available, “it would have taken less than eight weeks”). Although the walkway was ultimately not needed, *id.* at 184 (Tr. 846:7-13 (Cash)), Georgia Power spent \$471,515 planning for this contingency, *see* ECF No. 141-1 (“FHB Temporary Cask Loading Pit Walkway”).

After loading spent fuel assemblies into a HI-TRAC cask in the cask loading pit, the HI-TRAC is moved to the cask washdown area where the MPC is closed. *See* ECF No. 168 at 70-71 (Tr. 1255:4-1256:3 (Supko)). While the HI-TRAC is in the cask washdown area, the cask sits on a second, unique pedestal. *See* ECF No. 165 at 94-95 (Tr. 756:5-757:2 (Cash)). The pedestal is custom-designed to fit the precise contours of the HI-TRAC and to “prevent any horizontal movement of the HI-TRAC during an earthquake.” *Id.* at 95-96 (Tr. 757:19-758:2 (Cash)). The pedestal also serves to ensure that the MPC is at an accessible height for closing operations. *See* ECF No. 168 at 111-12 (Tr. 1296:19-1297:21 (Supko)). The cask washdown area pedestal cost \$180,000. *See* ECF No. 141-1 (“Cask Washdown Area Pedestal”).

In addition to the pedestal, Georgia Power installed seismic restraints in the cask washdown area to prevent the HI-TRAC cask from tipping as a result of seismic activity. *See* ECF No. 165 at 76-77 (Tr. 738:16-18, 738:25-739:6 (Cash)). The seismic restraints were, like the pedestals, custom-designed for Plant Vogtle. *See id.* at 78-79 (Tr. 740:18-

741:10 (Cash)); see also *id.* at 241 (Tr. 903:11-23 (Cash)) (testifying that it would be “highly unlikely” that a cask other than the HI-TRAC casks used at Plant Vogtle could use the same seismic restraints). Georgia Power spent \$1,247,077 to procure the cask washdown area seismic restraints. See ECF No. 141-1 (“CWA HI-TRAC Seismic Restraint System”).

Georgia Power also constructed a scaffolding staircase in the cask washdown area to accommodate the dry storage process. See ECF No. 165 at 89 (Tr. 751:2-13 (Cash)). The staircase provided more safety and stability than the existing ladder for the increased number of workers in the area during closure activities. See id. Georgia Power spent \$242,388 to replace the ladder with the scaffolding staircase. See ECF No. 141-1 (“Ladder Access to the FHB CWA Modification”). It also incurred costs of \$22,386.03 to construct temporary scaffolding for use before the stairs were complete. See ECF No. 141-1 (“Scaffold in FHB Unit 2 Spent Fuel Pool Area”); see also ECF No. 224 at 72 n.45.

In order to allow workers safe access to the forced helium dehydration system used in closing HI-TRAC casks from the top of the cask washdown area, Georgia Power installed two platforms made of step-over grating. See ECF No. 165 at 92-93 (Tr. 754:12-755:23 (Cash)). The platforms cost \$427,279. See ECF No. 141-1 (“AB Elevator/Stairwell Platform/FHD Skids”).

Georgia Power also constructed a cask washdown area work platform, which cost \$515,751. See ECF No. 141-1 (“AB Elevator/Stairwell Platform Modification”).

Also in the cask washdown area, Georgia Power installed 120-volt AC power receptacles to allow Holtec technicians to perform welding, forced helium dehydration, and other MPC closure activities. See ECF No. 165 at 104-05 (Tr. 766:16-767:12 (Cash)). The location of the new receptacles reduced radiation exposure by minimizing the time workers were required to spend near the top of the MPC, where radiation levels are highest. See id. at 105-06 (Tr. 767:10-768:7 (Cash)). The receptacles were also, however, installed for “convenience” and were not dedicated power sources. Id. at 186-87 (Tr. 848:12-849:8 (Cash)). Installation of the receptacles cost \$185,866. See ECF No. 141-1 (“120VAC Power Distribution System”).

To move the transfer casks, Georgia Power purchased a lift yoke that was specifically designed for use with the HI-TRAC casks. See ECF No. 165 at 135 (Tr. 797:1-21 (Cash)); see also ECF No. 173 at 96 (Tr. 2153:10-25 (Brewer)) (explaining that a lift yoke is a device that attaches the crane hook to the cask). The lift yoke, when not in use, is stored on a stand. See ECF No. 165 at 133-34 (Tr. 795:2-18, 796:1-10 (Cash)). In response to interrogatories, the DOE stated that in the non-breach world it would “not have provided a lift yoke stand because the need for a lift yoke stand would have been

determined by the unique needs of the specific plant.” DX 104 at 15. The lift yoke stand cost \$19,025.62. See ECF No. 141-1 (“HI-TRAC Lift Yoke Stand”).

The lift yoke stand, however, was not the initial storage solution for the lift yoke. Georgia Power first planned to use a storage arm mounted on the wall at Plant Vogtle, as it had done successfully at Plant Farley. See ECF No. 165 at 136 (Tr. 798:1-25 (Cash)). Georgia Power understood the storage arm to be the best practice in the industry for storing lift yokes. See id. at 137 (Tr. 799:9-12 (Cash)). Due to the short timeline for accommodating dry storage operations, Georgia Power proceeded with designing and fabricating the storage arm while at the same time evaluating whether the wall on which the arm would be placed was structurally adequate. See id. (Tr. 799:1-18 (Cash)). Unfortunately, the structural analysis concluded that the wall might fail in a seismic event, and therefore, the arm could not be used. See id.; see also id. at 179 (Tr. 841:13-15 (Cash)) (characterizing the failed effort as an “oops” moment). The parties have stipulated that the storage arm cost \$148,500. See ECF No. 141-1 (“Lift Yoke Wall Storage Arm”).

Outside the fuel handling building at Plant Vogtle, Georgia Power built a concrete pad to stage helium for the forced helium dehydration system used in removing moisture before closing canisters for dry storage. See ECF No. 165 at 102, 103-04 (Tr. 764:5-13, 765:20-766:6 (Cash)). By locating the pad outside the bay doors of the building, Georgia Power gained efficiencies related to the number of required personnel and steps required to meet decontamination requirements that would otherwise be implicated by bringing the helium inside. See id. at 102-03 (Tr. 764:14-765:13 (Cash)). The concrete pad cost \$307,109 to construct. See ECF No. 141-1 (“AB Exterior Concrete Pad”). The helium stored on the concrete pad was then connected to the forced helium dehydration system used in the cask washdown area through small bore piping. See ECF No. 165 at 104 (Tr. 766:7-10 (Cash)). The small bore piping cost \$469,736.50 to install. See ECF No. 141-1 (“New Non-Safety Related Small Bore Piping for Helium”).

When a cask is removed from the cask loading pit, it is decontaminated with demineralized, “very pure water.” ECF No. 165 at 82, 83 (Tr. 744:13-15, 745:3 (Cash)). Loaded HI-TRAC canisters are presently decontaminated over the spent fuel pool, but prior to the post-breach dry storage operations, piping allowed for decontamination in the cask washdown area. See id. at 86, 87 (Tr. 748:5-7, 749:5-13 (Cash)). The pipes in the cask washdown area “stuck out so far that [Georgia Power] would not be able to move a HI-TRAC into that area.” Id. at 86 (Tr. 748:14-15 (Cash)). As such, the pipes could no longer be used and were modified to accommodate the HI-TRAC transfer cask in the cask washdown area. See id. at 86, 87-88 (Tr. 748:16-17, 749:14-750:1 (Cash)). Georgia Power also acknowledged that the casks are decontaminated over the pool in order to minimize radiation exposure and contamination, and that they generally do not use the cask washdown area. See ECF No. 170 at 155-56 (Tr. 1812:22-1813:2 (Loftin)); see also ECF No. 165 at 191 (Tr. 853:9-13 (Cash)). The alterations to the demineralized water

system in the cask washdown area cost \$413,156.50. See ECF No. 141-1 (“Demineralized Water System in Cask Washdown Area”). In addition, because Georgia Power now decontaminates the HI-TRAC casks over the spent fuel pool, which dilutes the water in the cask loading pit, it is required to test for adequate boron levels in the pool every twenty-four hours during loading. See ECF No. 165 at 83 (Tr. 745:1-9 (Cash)). The cost for boron testing was \$25,000. See ECF No. 141-1 (“Boron Concentration Calculation”).

Finally, Georgia Power procured removable lights for the cask loading pit. The underwater lights allow personnel “to see with more clarity what’s going on when [they are] moving fuel into . . . the MPC in the HI-TRAC.” ECF No. 165 at 246 (Tr. 908:9-13 (Cash)). There is, however, “nothing specific about the Holtec cask system that requires lighting in loading pit.” Id. at 247 (Tr. at 909:21-24 (Cash)). Rather, the lights support “worker performance and nuclear safety in that they make sure that we can see better what we’re doing and we don’t inadvertently take a fuel assembly to someplace where it doesn’t need to go or it can’t go.” Id. at 246 (Tr. 908:17-22 (Cash)). The removable lights cost \$22,760. See ECF No. 141-1 (“Cask Loading Pit Lights”).

2. Cost Difference Between Repairing and Replacing Overhead Cask Handling Crane

In Plant Vogtle’s fuel handling building, Georgia Power has a 125-ton overhead cask handling crane. See ECF No. 164 at 130 (Tr. 649:6-10 (Cash)). The crane is used to move spent fuel casks from the cask loading pit to the cask washdown area, and then from the cask washdown area to the railroad bay for transport. See id. (Tr. 649:20-25 (Cash)). The crane also has two hoists—an auxiliary hook and a monorail hoist—that are used for other tasks such as moving new fuel and ancillary equipment. See id. at 130-31 (Tr. 649:25-650:6 (Cash)).

The crane presently used at Plant Vogtle is not the original crane. The original crane was installed in or around 1985. See ECF No. 170 at 149 (Tr. 1806:3-5 (Loftin)). The main hook of the original crane was designed to be used “if and when [Plant Vogtle was] able to send casks of fuel offsite,” pursuant to the Standard Contract. Id. (Tr. 1806:14-17 (Loftin)).

While using the 125-ton crane hook, plant personnel noticed that some of the bolts on the pillow block—a component of the crane that anchored the main hoist drum to the trolley structure—were elongating and breaking. See ECF No. 165 at 109 (Tr. 771:12-18 (Cash)); JX 34 at 5 (April 1986 deviation report noting problems with crane); JX 35 at 3-7 (Westinghouse Vogtle Cask Crane Problem Diagnosis & Recommendations presentation identifying a flawed design as the likely cause of the problems). Following an evaluation of the crane, it was de-rated from a 125-ton to 55-ton capacity. See ECF No. 170 at 149-50 (Tr. 1806:22-1807:9 (Loftin)). In addition to problems with the bolts,

the crane bridge appeared to be under strain. See ECF No. 165 at 156 (Tr. 818:5-10 (Cash)) (noting “loud and uncomfortable-sounding noises” from the crane bridge when the crane moved). At the time these issues were discovered, however, Plant Vogtle was not yet lifting spent fuel casks, so there was minimal impact on plant operations. See ECF No. 170 at 150 (Tr. 1807:16-20 (Loftin)). A number of repairs were undertaken over the years, but ultimately none solved the problems. See DX 173A at 80:9-22 (Channell deposition); ECF No. 165 at 147, 167-68 (Tr. 809:10-24, 829:24-830:4 (Cash)); ECF No. 170 at 151 (Tr. 1808:7-17 (Loftin)); DX 42 at 2 (April 2010 meeting minutes stating that “[r]epair and rehabilitation were performed but the problem would recur.”).

Before dry storage operations could begin, Georgia Power needed to either repair or replace the cask handling crane. Repairing the crane was the preferred course, and was a possibility according to several vendors, but the process of repairing the crane would involve a lengthy evaluation process that risked the plant’s ability to meet the strict timeline for removing spent fuel from the pool. See ECF No. 165 at 109-10, 112 (Tr. 771:19-772:17, 774:21-25 (Cash)). The crane would need to lift dry storage casks by the second quarter of 2013, and any delays “could be disastrous for dry storage.” Id. at 110-11 (Tr. 772:14-773:7 (Cash)).

Georgia Power ultimately determined that replacing the crane was “the most reliable method to have the crane available for dry storage in 2013.” Id. at 109 (Tr. 771:19-25 (Cash)); see also id. at 110-11 (Tr. 772:25-773:7 (Cash)) (noting that the plant “had to have a fix that was guaranteed to work [the] first time”); id. at 117 (Tr. 779:1-9 (Cash)) (explaining “the risk that the schedule for repair would exceed our allowable time”); ECF No. 170 at 152-53 (Tr. 1809:23-1810:2 (Loftin)) (testifying that “there was no guarantee that any attempted repairs would be successful”). Georgia Power also hired consultants from American Crane & Equipment Corporation, which issued a report evaluating the crane, and ultimately recommended that it be replaced rather than repaired. See JX 30 at 9 (American Crane & Equipment Corporation’s June 13, 2011 results of their May 2011 inspection of existing cask crane bridge and runway rail system).

Georgia Power argues that in the non-breach world it would have repaired the crane rather than replacing it, and thus seeks damages in an amount of the difference between the repair and replacement costs. See ECF No. 224 at 95. Georgia Power spent \$9,197,893.27 to replace the crane, see ECF No. 141 at 3, and estimated the cost to repair the crane in the non-breach world at \$3,494,883, see PDX Y at 74-76 (plaintiffs’ demonstrative exhibit reproducing information from PX 139, which was excluded from evidence in this court’s November 4, 2020 evidentiary rulings order, see ECF No. 202 at 17). Thus, the difference, according to Georgia Power’s expert, is \$5,703,010. See ECF No. 170 at 54-60 (Tr. 1711:18-1717:14 (Metcalf)).

3. Sally Port Installation

In the second round of litigation in these cases, the court found that Georgia Power built the new sally port to accommodate dry storage activities, and that it would not have done so in the non-breach world. See Alabama Power Co. v. United States, 119 Fed. Cl. 615, 632-34 (2014). In its 2014 opinion, the court noted that, for reasons related to both safety and efficiency, defendant's arguments that Georgia Power would not have built a new sally port in the non-breach world had some logical appeal. See id. at 633. Despite this appeal, however, the court concluded that the Standard Contract did not require Georgia Power to pursue such a course. See id. The court explained its conclusion as follows:

[I]nsofar as the non-breach world is one in which the parties abide by their contractual obligations, the court finds that Georgia Power would not have been required to install a new sally port. The government is, in fact, required under the contract to deliver casks that are "suitable for use at the Purchaser's site." Plaintiffs' Ex. 4 at IV.B.2. And casks requiring expensive building modifications are, by definition, not "suitable for use at the Purchaser's site."

Id.

Since the time that Georgia Power incurred the damages awarded by the court in 2014, it has finished installing the new sally port, which is used exclusively for dry storage activities. See ECF No. 165 at 237-38 (Tr. 899:22-900:1 (Cash)). Georgia Power paid \$7,242,557.29 to complete the sally port construction. See ECF No. 141-1 ("Vogtle Sally Port").

4. 2014 Fuel Sipping Campaign

Pursuant to the HI-STORM Certificate of Compliance, Georgia Power must determine which spent fuel assemblies meet the criteria for dry storage through a process called fuel characterization prior to loading assemblies into the HI-STORM dry storage casks. See ECF No. 162 at 107-08 (Tr. 107:19-108:19 (Williams)). The Standard Contract requires that utilities characterize fuel as either intact or failed. See JX 4 at VI.A.1(b); see also ECF No. 162 at 132-33 (Tr. 132:19-133:23 (Williams)) (agreeing that the Standard Contract requires utilities to characterize fuel prior to pick-up). The pertinent fuel characteristics are defined by the HI-STORM Certificate of Compliance and include, for example, the physical characteristics of the fuel, the number of fuel rods, the weight of the assemblies, the fuel condition, and the time that spent fuel cooled in the pool. Id. at 107-08 (Tr. 107:19-108:19 (Williams)); id. at 108-09 (Tr. 108:24-109:5 (Williams)).

When evidence of possible damage is found, plant personnel must conduct additional evaluation. One method of evaluation is called fuel sipping. See ECF No. 224 at 128. Through fuel sipping, the plant can determine whether a fuel assembly is damaged, and therefore requires special handling before storage. See ECF No. 162 at 114-16 (Tr. 114:20-116:18 (Williams)). The HI-STORM Certificate of Compliance does not require Georgia Power to use fuel sipping, but does require Georgia Power to certify that the fuel is intact. See id. at 117 (Tr. 117:1-10 (Williams)). Georgia Power uses the fuel sipping method when necessary because it believes fuel sipping is the “most efficient and effective way to determine if there is a cladding defect within a fuel assembly.” Id. (Tr. 117:13 (Williams)).

In 2014, plant personnel and Westinghouse Electric Company personnel reviewed chemistry data from past reactor cycles in advance of a dry cask loading campaign and found that it was unclear whether the pool contained damaged fuel assemblies. See id. at 110 (Tr. 110:1-18 (Williams)). To ensure that the fuel assemblies in the pool were intact, as required by the HI-STORM Certificate of Compliance, Georgia Power characterized the fuel by performing a fuel sipping campaign. See id. at 114 (Tr. 114:22-24 (Williams)); see also ECF No. 170 at 202 (Tr. 1859:17-25 (Loftin)).

At the time of the fuel sipping campaign, the DOE had not provided Georgia Power with the loading or fuel characterization procedures that it would require when it performs under the Standard Contract. See ECF No. 162 at 130 (Tr. 130:2-12 (Williams)). In addition, the DOE admits that the spent fuel may not be transportable in the canisters at the time of the DOE’s future performance; that decision must be made contemporaneously. See DX 104 at 50 (defendant’s June 13, 2016 response to plaintiffs’ first consolidated discovery requests).

Georgia Power incurred costs of \$805,873.50 for the 2014 Westinghouse fuel sipping campaign. See ECF No. 141-1 (“Vogtle Fuel Sipping”).

5. Dry Storage Engineering Costs

In designing its dry storage program at Plant Vogtle, Georgia Power developed a number of unique designs, from the preliminary to final stages, with no guidance from the DOE. See ECF No. 164 at 108-09 (Tr. 627:17-628:25 (Cash)); ECF No. 165 at 14, 15-16 (Tr. 676:18-24, 677:16-678:13 (Cash)). Due to the complexity of the project, Georgia Power made changes and encountered delays in the process. See ECF No. 164 at 112-13 (Tr. 631:19-632:11 (Cash)).

Mr. Jimmy Cash testified at trial as Plant Vogtle’s certified project manager for the dry storage project. See id. at 95-96, 102 (Tr. 614:12-615:14, 621:15-18 (Cash)). Mr. Cash testified that project changes and delays are an expected part of unique projects. See id. at 110-11, 137-38 (Tr. 629:1-630:1, 656:24-657:25 (Cash)); ECF No. 165 at 9-10

(Tr. 671:25-672:6 (Cash)). According to Mr. Cash, the engineering costs associated with changes or delays with the dry storage build out at Plant Vogtle were ordinary and unsurprising. See id. at 19-20 (Tr. 681:18-682:11 (Cash)). He also acknowledged, however, that the project was “time-critical,” and resulted in approximately five years of work needing to be completed in three and a half years. Id. at 195 (Tr. 857:3-12 (Cash)). The engineering costs associated with changes or delays amount to \$1,741,478. See ECF No. 224 at 138 (citing DDX G-10; ECF No. 174 at 101-04 (Tr. 2424:14-2427:4 (Johnson))).

F. Plant Farley

On June 13, 1983, the government entered into a contract with Alabama Power with regard to the disposal of fuel from Plant Farley. See ECF No. 141 at 1-2. In this phase of litigation, Alabama Power seeks damages to cover costs it alleges were incurred, due to the government’s partial breach of the Standard Contract from January 1, 2011, through December 31, 2014. See ECF No. 17 at 1; ECF No. 141 at 2.

During that time, Alabama Power incurred costs related to Plant Farley’s dry cask storage program including damages for price adjustments to its contract with Holtec as a result of excess inventory, and additional costs related to the procurement and loading of Holtec casks. See ECF No. 224 at 39-54. Alabama Power’s alleged damages for these categories are as follows:

Contract Price Adjustment:	\$742,903.92
Costs Related to Procurement and Loading	
Seismic Restraint Hardware:	\$1,007,358.28
Holtec Storage Fees:	\$274,495.57
Delay Charges:	\$1,964,500.00
	<hr/>
Total:	\$3,989,257.77

See ECF No. 224 at 26. The court will address the pertinent facts for each category, in turn.

1. Contract Price Adjustment

Pursuant to Alabama Power’s contract with Holtec, it must order storage casks well in advance of—at least two years before—the loading campaign in which they will be used. See ECF No. 163 at 60-61, 61-62 (Tr. 274:7-275:3, 275:17-276:9 (Channell)); see also id. at 54-55 (Tr. 268:21-269:15 (Channell) (testifying that plaintiffs generally schedule loading campaigns two years in advance)). Alabama Power intended to conduct loading campaigns at Plant Farley in 2009, 2011, and 2012. See id. at 55 (Tr. 269:16-22

(Channell)). The 2009 campaign, in which Alabama Power planned to load seven casks, was canceled due to incomplete but necessary work on the forced helium dehydration system and the press of other work at the plant. See id. at 55-56, 62 (Tr. 269:23-270:12, 276:13-14 (Channell)).

At the time of cancellation, Alabama Power had already ordered casks for all three loading campaigns, twelve of which had not yet been delivered. See id. at 56 (Tr. 270:13-24 (Channell)). Alabama Power loaded two casks in 2010, but due to the 2009 campaign cancellation, the plant had an excess of casks on site. See id. at 65 (Tr. 279:20-24 (Channell)). Alabama Power worked with Holtec to delay the delivery schedule of the remaining twelve casks, and as a result, incurred \$742,903.92 in price increases under its contract. See id. at 66-69 (Tr. 280:17-283:2 (Channell)); see also ECF No. 141 at 3-4; ECF No. 141-1. The delay also had the effect of “free[ing] up capital resources that [Alabama Power] would have had to otherwise commit unnecessarily,” ECF No. 163 at 70 (Tr. 284:21-24 (Channell)), which limited costs passed through to ratepayers at that time, see id. at 72 (Tr. 286:1-3 (Channell)).

2. Costs Related to Procurement and Loading

After canceling the 2009 loading campaign, Plant Farley loaded two HI-STORM systems in 2010. See id. at 73-74 (Tr. 287:19-288:1 (Channell)). The plant then conducted another loading campaign in 2011 in order to avoid an adverse impact on operations due to small spent fuel pool margins. See id. at 113, 145-46 (Tr. 327:4-7, 359:10-360:11 (Channell)); see also id. at 220 (Tr. 434:4-8 (Channell)) (testifying that the plant would not have been under the “same pressure” to load casks in 2011 had the 2009 campaign gone forward”); DX 173A at 146:24-147:1 (Mr. Channell testifying that when the 2009 campaign was canceled, “it was already known that [Plant Farley] would lose core offload capability” as a result). The loading campaign was scheduled to begin in late February 2011. See ECF No. 163 at 74 (Tr. 288:6-11 (Channell)). Necessary modifications to the forced helium dehydration system caused a two-week delay, but the campaign ultimately began in March 2011. See ECF No. 163 at 74, 75, 76 (Tr. 288:12-21, 289:10-14, 290:7-19 (Channell)).

As the loading campaign began, Alabama Power received a copy of a report issued by the Nuclear Regulatory Commission (NRC) to the Perry Nuclear Plant in Ohio. See JX 41 (NRC report). The NRC had determined that the configuration at Plant Perry required lateral seismic restraints to ensure the stacked equipment did not tip. See id. at 4. Despite the fact that the Perry Plant used the same stack-up configuration during loading as Plant Farley, Alabama Power concluded that the new requirement did not apply to Plant Farley, and continued with the loading campaign. See ECF No. 163 at 80-81, 85 (Tr. 294:25-295:2; 299:19-20 (Channell)). Shortly thereafter, the NRC notified Alabama Power that it must stop the loading campaign or risk the issuance of a willful violation of its regulations. See id. at 85 (Tr. 299:21-24 (Channell)).

Plant Farley immediately stopped the loading campaign. See id. at 87 (Tr. 301:9-10). As a result of this series of events, the plant incurred significant costs related to the delay and the procurement of seismic restraints.

a. Seismic Restraint Hardware

As a result of the conclusions reached by the NRC regarding the need for seismic restraints, in April 2011, Alabama Power sent a letter to the NRC explaining its disagreement with the NRC's conclusions that a freestanding stack-up configuration was not permitted absent prior approval pursuant to 10 C.F.R. Part 72. See PX 77. At the same time, however, Alabama Power proceeded with designing and procuring adequate seismic restraints to hedge against the possibility that the disagreement with the NRC would not be resolved before loading became imperative to the operation of Plant Farley. See ECF No. 163 at 88, 95, 97-98, 147, 150-155, 158 (Tr. 302:13-18, 309:20-22, 311:23-312:9, 361:14-25, 364:6-369:1, 372:18-25 (Channell)).

In June 2011, the NRC responded to Alabama Power's letter and provided certain conditions under which Plant Farley would be permitted to continue loading without seismic restraints. See JX 25 (plaintiffs' April 8, 2011 letter addressing the NRC's response to Region III technical assistance request). Alabama Power concluded that such conditions were met, and continued the loading campaign without the restraints. See ECF No. 163 at 107, 112 (Tr. 321:5-13, 326:6-22 (Channell)). Due to the delay in connection with resolving the NRC's concerns, Plant Farley ultimately loaded three casks rather than the seven or eight it had initially planned to load. See id. at 159 (Tr. 373:8-20 (Channell)). Alabama Power incurred \$1,007,358.28 in design and fabrication costs related to the seismic restraints hardware that it ultimately did not need. See ECF No. 141-1.

b. Holtec Storage Fees

Because Plant Farley was only able to load three casks in 2011 rather than seven or eight, a number of unused HI-STORMs remained stored on the fabrication pad at the plant. See ECF No. 163 at 159-60 (Tr. 373:21-374:11 (Channell)). Alabama Power, therefore, could not store the additional casks it had ordered for the previously scheduled 2012 loading campaign, and delayed the delivery until 2013 and paid Holtec to store the casks until then. See id. at 161 (Tr. 375:5-12 (Channell)). The storage costs amounted to \$274,495.57. See ECF No. 141-1.

c. Delay Charges

Plant Farley incurred delay charges related to the 2011 loading campaign for two reasons. First, the loading campaign was initially scheduled to begin on February 28,

2011, but was delayed until March 15, 2011, as a result of necessary work to the forced helium dehydration system. See ECF No. 163 at 74 (Tr. 288:6-289:19 (Channell)). Alabama Power wanted to complete the work while the loading campaign began, but Holtec objected to that plan and insisted that the work be done first. See id. at 75 (Tr. 289:10-14 (Channell)); see also id. at 209 (Tr. 423:13-21 (Channell)) (noting that while Holtec insisted that the forced helium dehydration skid work was done prior to loading, it was Alabama Power's responsibility to complete the work). This delay resulted in an upward price adjustment on Alabama Power's contract with Holtec in an amount of \$227,370. See id. at 213 (Tr. 427:4-7 (Channell)); DX 61.

Second, after the loading campaign began, the NRC's concerns caused further delay. See ECF No. 163 at 87 (Tr. 301:5-10 (Channell)). Loading casks in 2011 was "absolutely essential" ahead of planned outages in 2011 and 2012. See id. at 113 (Tr. 327:4-7 (Channell)). If Plant Farley were unable to load casks in 2011, it would have been forced to take actions that would have extended the outages, thereby either decreasing revenue or increasing generation costs. See id. at 155-57 (Tr. 369:24-371:19 (Channell)). Because the loading campaign was critical, Alabama Power believed that it needed to ensure that the crew scheduled to conduct it would be available as soon as it could proceed. See id. at 170-71 (Tr. 384:23-385:7 (Channell)). As such, Alabama Power retained the crew on-site while it resolved the NRC's concerns to prevent that crew from being reassigned to another campaign and becoming unavailable when Plant Farley was ready to proceed with loading. See id.; see also id. at 171-72 (Tr. 385:13-386:4 (Channell)). Alabama Power's concern that releasing the crew would unduly extend the delay was not confirmed, but rather was a "general understanding" of the state of the industry. See DX 173A at 171:24-172:7. The crew was ultimately retained but idle for approximately three months. See ECF No. 224 at 53. Combined with the initial delay costs, Alabama Power incurred delay-related costs of \$1,964,500. See ECF No. 141-1.

G. Fleet Issues

Plaintiffs also claim damages that are not specific to one plant, including: (1) internal labor costs for daily vent inspections; and (2) instrument tube tie rod (ITTR) repairs.

1. Internal Labor Costs for Daily Vent Inspections

Plaintiffs store spent nuclear fuel in MPCs, which are in turn stored in HI-STORM 100 overpacks on independent spent fuel storage installation (ISFSI) pads. See ECF No. 224 at 171. Each overpack has four vents to allow air to circulate around the MPC and regulate temperature. See ECF No. 163 at 266 (Tr. 480:23-25 (Martin)); id. at 18-19 (Tr. 232:16-233:8 (Channell)). The technical specifications require that plaintiffs monitor the vents for proper cooling and airflow at least once every twenty-four hours. See id. at

179, 184 (Tr. 393:5-13, 398:7-15 (Channell)). Although such monitoring may be accomplished either by visual inspection or electronic monitoring, plaintiffs conduct visual inspections because they consider such inspections to be more reliable. See id. at 180-81 (Tr. 394:16-395:10 (Channell)).

Plant personnel perform the daily visual inspections of the overpacks as part of outside rounds at each site. See id. at 181 (Tr. 395:8-15 (Channell)). While the outside rounds included other tasks, the vent inspections involved a defined process, which Mr. Cale Martin, plaintiffs' Project Cost Analyst Lead, explained as follows:

[W]hen you do a vent inspection, it is not just the time in the ISFSI, observing the vents to make sure they're clear of blockage. There are special characteristics of a nuclear power plant that make you sign into radiation work permits. There's more than just being inside the ISFSI, the independent spent fuel storage installation. There's a process of getting there, going through the right processes, to be able to access the ISFSI, and then doing the vent inspection and then going back through the back end of the process, to be able to perform the vent inspection.

Id. at 269-70 (Tr. 483:25-484:10 (Martin)). Despite this defined process, however, plant personnel who conduct the inspections do not track the time spent doing so separately from the other tasks conducted during rounds. See id. at 183 (Tr. 397:7-14 (Channell)). At Plant Vogtle and Plant Farley, the inspections were performed twice per day, and at Plant Hatch, the inspections were performed once per day. See id. at 181-82, 184-85 (Tr. 395:16-396:2, 398:16-399:5 (Channell)).

Because the time is not separately tracked, plaintiffs estimated the costs associated with the vent inspections. Mr. Channell conferred with the plant personnel who perform the inspections and they estimated that the inspections take "roughly 45 minutes per day to go through the process of getting the paperwork, going out the ISFSI, doing the inspections, completing the paperwork, and moving on to the next test." Id. at 186 (Tr. 400:9-19 (Channell)). Based on his knowledge of plant operations and geography, Mr. Channell considered the forty-five-minute estimate to be "reasonable." Id. at 198-99 (Tr. 412:11-413:3 (Channell)).

Mr. Martin also personally observed vent inspections at each plant and tracked the required time. See id. at 265 (Tr. 479:14-21 (Martin)); see also PX 141 (Sept. 7, 2018 Farley Vent Inspection Observation), PX 143 (undated Hatch inspection observation), PX 144 (July 12, 2018 Vogtle Vent Inspection Walkdown), and PX 145 (HI-STORM Vent Inspection Observations). The process observed by Mr. Martin included: (1) visiting the Radiation Protection office to collect safety equipment and required paperwork, see ECF No. 163 at 281, 282 (Tr. 495:2-24, 496:13-17) (Martin)); ECF No. 164 at 14-16, 27, 30 (Tr. 533:19-534:4, 534:20-535:5, 546:3-12; 549:1-4 (Martin)); (2) travelling to the ISFSI

at each plant, on foot at Plants Vogtle and Farley, see id. at 19, 28 (Tr. 538:5-10, 547:11-13 (Martin)), and by vehicle at Plant Hatch,⁸ see ECF No. 163 at 289 (Tr. 503:5-13 (Martin)); (3) visually inspecting the casks, see id. at 294 (Tr. 508:2-11) (Martin)); ECF No. 164 at 22, 29 (Tr. 541:4-12, 548:7-11 (Martin)); (4) conducting a check for contamination upon exiting the ISFSI pad, see PX 145 at 1-3; (5) returning to the Radiation Protection office, id.; and (6) passing through personnel contamination monitors in the Radiation Protection offices, see id.; ECF No. 163 at 296 (Tr. 510:5-18 (Martin)).

The plant personnel who performed inspections at Plant Hatch earned hourly rates during the damages period at issue as follows: \$33.56 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See PX 138 at 4. The plant personnel who performed inspections at Plant Vogtle earned hourly rates during the damages period at issue as follows: \$33.56 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See id. at 5. And the plant personnel who performed inspections at Plant Farley earned hourly rates during the damages period at issue as follows: \$32.15 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See id. at 3.

Plaintiffs estimate that they have incurred damages in an amount of \$143,189.44 for vent inspections, divided between plants as follows: (1) \$39,860.74 at Plant Hatch; (2) \$24,379.20 at Plant Vogtle; and (3) \$78,949.50 at Plant Farley. See ECF No. 224 at 144 (citing ECF No. 170 at 65 (Tr. 1722:2-13 (Metcalf))). Plaintiffs' expert Mr. Kenneth Metcalfe, testified that:

to arrive at the sum total of damages, . . . [he] took the number of hours that Plaintiffs estimated it took to perform vent inspection activities each time they were performed and then multiplied that number by (1) the number of inspections per day and (2) the number of days per year to arrive at the number of manhours per year Plaintiff[s] estimated it took to perform vent inspection activities at each of their plants.

ECF No. 224 at 144 (citing ECF No. 170 at 93-94 (Tr. 1750:13-1751:6) (Metcalf))). That number was then multiplied by the applicable hourly rate for each plant in each year. See id. (citing ECF No. 170 at 94 (Tr. 1751:7-15 (Metcalf))).

During his inspection observations, Mr. Martin observed that vent inspections at Plant Hatch took 1.17 hours, at Plant Vogtle took 37 minutes, and at Plant Farley took 40 minutes. See ECF No. 164 at 38-39 (Tr. 557:5-7, 558:1-3, 558:7-9 (Martin)). Based on these estimates, Mr. Martin calculated the cost of vent inspections at the three plants for

⁸ The more remote ISFSI at Plant Hatch required additional security measures both before and after inspections. See ECF No. 163 at 290, 294, 295 (Tr. 504:18-20, 508:17-25, 509:13-19 (Martin)); see also PX 145 at 1.

the damages period at \$184,000. See id. at 40 (Tr. 559:8-17 (Martin)). According to Mr. Channell, however, plaintiffs chose not to revise their original estimates so as to “not be at risk of over-claiming what the time was.” ECF No. 163 at 200 (Tr. 414:23-25 (Channell)).

2. Instrument Tube Tie Rod Repairs

In May 2001, Westinghouse informed plaintiffs that certain fuel assemblies present at Plants Farley and Vogtle had a design defect. See ECF No. 162 at 143 (Tr. 143:6-17 (Williams)); PX 116 (Westinghouse letters to plaintiffs). Because the defect was first identified at the North Anna Nuclear Generating Station, assemblies with this defect are referred to as “North Anna fuel.” See ECF No. 169 at 7 (Tr. 1380:15-18 (Supko)). Westinghouse also notified plaintiffs that it had developed a Nozzleless Handling Tool (NHT) which could be used with the North Anna fuel:

Westinghouse has designed tools to handle 14x14, 15x15 or 17x17 fuel assemblies that do not have a top nozzle due to difficulties experienced during fuel repair. This tool can also be used to handle assemblies where the top nozzle is still present, yet the attachment of the top nozzle to the fuel assembly is suspect . . . Refinements of this tool’s design for the more frequent use anticipated with this nozzle separation issue are planned.

PX 116 at 11.

Plaintiffs inspected their North Anna fuel in 2002, 2003, and 2007. See ECF No. 162 at 148 (Tr. 148:5-6 (Williams)). They used the NHT in the 2007 inspections. See id. at 149-50 (Tr. 149:10-150:12 (Williams)). “While using the NHT in 2007, [plaintiffs’] personnel had to perform lengthy inspections of [part of the NHT], which had some associated radiation dose” with it. ECF No. 224 at 153 (citing ECF No. 162 at 149 (Tr. 149:10-15 (Williams))).

In 2008, Plant Farley began repairing the ITTR on the North Anna fuel in order to better facilitate handling assemblies with a standard fuel handling tool rather than the NHT. See ECF No. 162 at 135, 150 (Tr. 135:9-16, 150:16-17 (Williams)). Plaintiffs were concerned about the ability to move assemblies before and after refueling outages to ensure that plaintiffs were meeting “certain criticality (or heat load) requirements that are required by its NRC licenses.” ECF No. 224 at 154 (citing ECF No. 162 at 184 (Tr. 184:2-7 (Williams)), ECF No. 169 at 129 (Tr. 1502:6-21 (Supko))). Because the DOE had failed to perform under the Standard Contract, the pools were full, and it became very difficult to . . . manage the spent fuel pools at the plants.” Id. at 155 (citing ECF No. 162 at 150-51 (Tr. 150:24-151:3 (Williams))). This resulted in the need to move fuel frequently, which lead Plant Farley to make permanent ITTR repairs. See id. The permanent repairs improve the ability to handle the fuel both in the pools, when loaded

into dry casks, and potentially back into the pools when the DOE does perform. See id. (citing ECF No. 162 at 158 (Tr. at 158:4-11 (Williams))). For the same reasons, Plant Vogtle decided to make permanent ITTR repairs. See id. at 156 (citing ECF No. 162 at 159-60 (Tr. 159:17-21, 160:2-12 (Williams))).

In March 2009, Westinghouse recommended that utilities discontinue use of the NHT in their spent fuel pools pending a technical review, see id. at 155 (citing ECF No. 162 at 165 (Tr. 165:10-15 (Williams))), and on July 2, 2009, Westinghouse issued a technical bulletin in which it recommended that utilities stop using the NHT in operations such as dry cask loading, see JX 21.

After the inspections, Plant Farley loaded 148 assemblies suspected of having defects into dry storage. See ECF No. 162 at 174 (Tr. 174:5-9 (Williams)). Plant Farley prioritized loading North Anna fuel to avoid stress corrosion cracking that could contaminate the pool, and to avoid the need for continued inspection and moving of potentially damaged fuel. See id. at 183 (Tr. 183:2-13 (Williams)). Plant Farley had 980 suspect assemblies, see id. at 170 (Tr. 170:23 (Williams)), and Plant Vogtle had 193, see id. at 171 (Tr. 171:3 (Williams)). Plaintiffs argue that, in the non-breach world, they would have prioritized loading all suspect assemblies to the government and that they had sufficient allocations to do so prior to March 2009. See ECF No. 224 at 159-60; see also ECF No. 162 at 187 (Tr. 187:14-24 (Williams)) (asserting that plaintiffs had the authority to decide which fuel was loaded and when).

At Plant Farley, 299 suspect assemblies were repaired with ITTRs during the claim period at issue, at a cost of \$1,047,905.50. See id. at 174, 196 (Tr. 174:5-9, 174:21-24, 196:14-16 (Williams)); ECF No. 169 at 9 (Tr. 1382:10-13 (Supko)); ECF No. 170 at 69 (Tr. 1726:22-24 (Metcalf)); ECF No. 141-1. At Plant Vogtle, 193 assemblies were repaired with ITTRs during the claim period at issue, at a cost of \$1,952,708. See ECF No. 162 at 175 (Tr. 175:9-12 (Williams)); ECF No. 170 at 69 (Tr. 1726:22-24 (Metcalf)); ECF No. 141-1. The total claim for ITTR repairs, then, is \$3,000,613.50. See ECF No. 141-1.

II. Legal Standards

Under traditional contract law principles, which govern in spent nuclear fuel disputes, the remedy for a breach “is damages sufficient to place the injured party in as good a position as it would have been had the breaching party fully performed.” Indiana Michigan Power Co. v. United States, 422 F.3d 1369, 1373 (Fed. Cir. 2005). Specifically, “[d]amages for a breach of contract are recoverable where: (1) the damages were reasonably foreseeable by the breaching party at the time of contracting; (2) the breach is a substantial causal factor in the damages; and (3) the damages are shown with reasonable certainty.” Id. (citing Energy Capital Corp. v. United States, 302 F.3d 1314, 1320 (Fed. Cir. 2002)). A plaintiff must demonstrate each of these requirements by a

preponderance of the evidence. See Entergy Nuclear Indian Point 2 v. United States, 128 Fed. Cl. 526, 534 (2016); Bice v. United States, 61 Fed. Cl. 420, 435 (2004) (“In civil adjudication, courts generally impose a burden of persuasion of ‘preponderance of the evidence,’ understood as simply more likely than not.”)

To establish that damages were reasonably foreseeable, “a plaintiff must show that the type of damages are foreseeable as well as the fact of damage.” See Vermont Yankee Nuclear Power Corp. v. Entergy Nuclear Vermont Yankee, 683 F.3d 1330, 1344 (Fed. Cir. 2012). As the Federal Circuit has explained:

Although this does not require “actual foresight” that the breach will cause a “specific injury or a particular amount in money[,] . . . the injury actually suffered [still] must be one of a kind that the defendant had reason to foresee and of an amount that is not beyond the bounds of reasonable prediction.”

Id. (citing Joseph M. Perillo, 11 Corbin on Contracts § 56.7 at 108 (rev. ed. 2005) (emphasis added)).

Plaintiffs must then show that the government’s breach was a “substantial causal factor” in the damages they seek to recover. Indiana Michigan, 422 F.3d at 1373. Although the but-for test is also an acceptable causation standard, trial courts have discretion to decide which standard should be applied in a particular case. Yankee Atomic Elec. Co. v. United States, 536 F.3d 1268, 1272 (Fed. Cir. 2008) (citing Citizens Fed. Bank v. United States, 474 F.3d 1314, 1318 (Fed. Cir. 2007)). In the first and second phases of this litigation, the court opted to apply the substantial factor test and will do so in this third phase as well. See S. Nuclear, 77 Fed. Cl. at 405; Alabama Power, 119 Fed. Cl. at 624.

As part of their causation argument, plaintiffs must present a “comparison between the breach and non-breach worlds.” Yankee Atomic, 536 F.3d at 1273. The plaintiff bears the burden of proving “the extent to which [their] incurred costs differ from the costs [they] would have incurred in the non-breach world.” Energy Nw. v. United States, 641 F.3d 1300, 1306 (Fed. Cir. 2011).

And, although damages must be “shown with reasonable certainty,” they need not be “ascertainable with absolute exactness or mathematical precision,” but “recovery for speculative damages is precluded.” Indiana Michigan, 422 F.3d at 1373 (citations omitted). Enough evidence to allow the court to make “a fair and reasonable approximation” is required. Bluebonnet Sav. Bank v. United States, 266 F.3d 1348, 1355 (Fed. Cir. 2001) (citations omitted).

In addition to these basic principles, a non-breaching party is obligated to mitigate its damages when “a reasonable person, in light of the known facts and circumstances,

would have taken steps to avoid damage.” Indiana Michigan, 422 F.3d at 1375. The Circuit has explicitly stated that, in order to recover mitigation damages, the mitigating party must “prove foreseeability, causation, and reasonableness.” Id. at 1376. But when mitigation efforts are “reasonable, foreseeable, and caused by the Government’s partial breach, their ultimate success and usage is irrelevant.” Yankee Atomic, 536 F.3d at 1276.

After plaintiffs make their case for mitigation damages, however, “the defendant may eliminate or reduce the alleged damages by showing either that the ‘[p]laintiffs did not undertake reasonable mitigation efforts, or that the efforts they did undertake were unreasonable.’” Entergy Nuclear Vermont Yankee, LLC v. United States, 95 Fed. Cl. 160, 184 (2010) (citing Carolina Power & Light Co. v. United States, 82 Fed. Cl. 23, 44 (2008), rev’d on other grounds, Vermont Yankee, 683 F.3d 1330 (Fed. Cir. 2012)).

And finally, defendant may secure a reduction in the damages it owes if it demonstrates that plaintiffs entirely avoided certain costs as a result of its breach, but not if such costs were “merely deferred.” Carolina Power & Light Co. v. United States, 573 F.3d 1271, 1277 (Fed. Cir. 2009) (denying the government’s requested reduction because “[p]laintiffs have not avoided the costs of loading. Rather, they have merely deferred these costs.”).

III. Analysis and Conclusions of Law

In this phase of the litigation, plaintiffs have alleged entitlement to damages in the amount of \$177,571,872. See ECF No. 224 at 12. Of that total, the court has previously determined that Georgia Power Company is entitled to recover \$111,959,799 on undisputed claims related to Plants Hatch and Vogtle, and that Alabama Power Company is entitled to recover \$31,193,958 on undisputed claims related to Plant Farley, for a total of \$143,153,757. See ECF No. 92 at 9. The court will analyze plaintiffs’ remaining claims in six broad categories: (1) damages associated with Plant Hatch; (2) damages associated with Plant Vogtle; (3) damages associated with Plant Farley; (4) damages related to all three plants; (5) reduction for the improper allocation of indirect costs; and (6) defendant’s offset claim.

A. Plant Hatch’s Holtec Mating Device Repairs

Georgia Power argues that defendant’s breach resulted in the need for a mating device at Plant Hatch to facilitate dry storage, and as a result, it is entitled to recover for the cost of repairing the mating device. See ECF No. 224 at 35-39. As noted above, the “mating device is a piece of equipment that facilitates the transfer of the [MPC] from the HI-TRAC transfer cask into the HI-STORM overpack.” Id. at 35-36 (citing ECF No. 163 at 23 (Tr. 237:6-9 (Channell))). To accomplish this, the mating device sits between the HI-STORM overpack and the HI-TRAC transfer cask. See ECF No. 163 at 23 (Tr.

237:18-21 (Channell)). The device required repairs because, while conducting a practice loading campaign at Plant Hatch, Georgia Power discovered that Holtec had manufactured a mating device that was too narrow, and as a result, had to be ground down to fit properly on the HI-TRAC casks. See id. at 174, 175 (Tr. 388:4-21, 389:1-22 (Channell)). The repairs to the mating device cost \$52,014.44. See ECF No. 141-1.

According to defendant, the repair costs were not foreseeable, and defendant's partial breach of the Standard Contract did not proximately cause the need for repair. See ECF No. 229 at 19-24. Defendant's argument is premised on the idea that "the proximate cause of plaintiff[s] claimed costs was Holtec's flawed design and manufacture of the mating device," rather than defendant's breach. Id. at 20. Defendant insists that "[e]ven if plaintiffs are correct that they never would have needed a mating device but for DOE's butbreach, the causal chain between the breach and plaintiff[s] claimed costs was broken by Holtec's independent mistake." Id. To find otherwise, defendant suggests, would be to create a world in which "any post-breach costs that have any nexus to dry storage—however attenuated—is per se recoverable." Id. at 19.

The court disagrees with the dramatic implication of defendant's argument—that by awarding damages for the mating device repairs in this case the court would create a category of damages that is per se recoverable. To the contrary, as with all categories of damages, Georgia Power must demonstrate that the damage was reasonably foreseeable, that defendant's breach was a substantial causal factor, and that damages are reasonably certain. See Indiana Michigan, 422 F.3d at 1373.

With regard to reasonable foreseeability, the Federal Circuit has noted that it is only the "kind" of damage the defendant must be able to foresee, and that the amount is "not beyond the bounds of reasonable prediction." Vermont Yankee, 683 F.3d at 1344. (citation omitted). Defendant contends that "it was not reasonably foreseeable to DOE that in the event of a breach, a third-party would mis-manufacture its own specialty product, necessitating the sort of remedial work at issue here." ECF No. 229 at 20. This court's precedent does not support defendant's position.

In Yankee Atomic, this court permitted nuclear utilities to recover damages for the DOE's breach of the Standard Contract when the utilities incurred increased construction costs after they terminated contractors hired to build ISFSIs and completed the work themselves. See Yankee Atomic Elec. Co. v. United States, 113 Fed. Cl. 323, 333 (2013). The court reasoned that, even though the increased construction costs were indirectly caused by the DOE's breach, the costs were recoverable because they were nonetheless traceable to the breach with reasonable certainty. See id. at 334 (finding that the damages were sufficiently traceable to the breach because plaintiffs hired the contractors "to assist with ISFSI construction, which would have been entirely unnecessary if the government had performed its obligations under the contract").

Defendant urges the court to distinguish the holding in Yankee Atomic, arguing that unlike in this case, Yankee Atomic involved increased construction costs that were “commonplace” and thus reasonably foreseeable.⁹ ECF No. 229 at 21. Here, defendant claims that the “DOE could not have reasonably foreseen in 1983 . . . that a contractor would mis-manufacture its own specialized mating device.” Id. Defendant argues that this case is more like Duke Energy, in which the court denied plaintiff damages caused by its own conduct. See Duke Energy Progress v. United States, 135 Fed. Cl. 279, 289 (2017).

In Duke Energy, the court denied plaintiff’s request to recover damages caused by plaintiff’s own conduct for two reasons. First, the damage—delamination in the utility’s containment building—was caused by plaintiff’s unforeseeable and unusual decision to manage the work itself rather than hiring a professional engineering firm, as was industry practice. See id. And second, plaintiff admitted that the “DOE’s performance had nothing to do with this project or the resulting delamination.” Id. Neither of these reasons is applicable in this case. Georgia Power did hire a professional firm to assist with the work—Holtec—and it was that professional firm that made the error. See ECF No. 163 at 174, 175 (Tr. 388:4-21, 389:1-22 (Channell)). Moreover, the mating device is integrally related to the dry storage operations, and therefore, very much a part of the effort to address defendant’s performance failure. See id. at 23 (Tr. 237:6-21) (Channell).

The court further notes that, defendant’s narrow characterization of the type of damage at issue is contrary to the standard that the Federal Circuit has articulated, which requires only that the injury be “one of a kind that the defendant had reason to foresee.” Vermont Yankee, 683 F.3d at 1344. Defendant argues that the DOE could not have foreseen that “a contractor would mis-manufacture its own specialized mating device.” ECF No. 229 at 21. The Federal Circuit’s instruction does not require such precision. Dry storage is a complex undertaking, and plaintiff appropriately hired a professional firm to manufacture equipment it needed to facilitate the work. See ECF No. 163 at 174, 175 (Tr. 388:4-21, 389:1-22 (Channell)). In the court’s view, a mistake in the course of manufacturing necessary equipment is well within the reasonably foreseeable realm, even if defendant could not specifically predict that “a contractor would mis-manufacture its own specialized mating device.” ECF No. 229 at 21.

The final two requirements for recovery are likewise met. The DOE’s breach was a substantial causal factor in the repair damages. See Indiana Michigan, 422 F.3d at 1373. Absent the DOE’s failure to perform, Georgia Power would not have undertaken dry storage activities, and thus, would not have needed the mating device. See ECF No.

⁹ Notably, defendant offers no authority to assist the court in defining what is “commonplace” in this context. See ECF No. 229 at 21.

163 at 23 (Tr. 237:6-21) (Channell). In addition, the parties have stipulated to the cost of the repairs. See ECF No. 141-1. As such, the damages are reasonably certain.

For these reasons, Georgia Power is entitled to recover the costs for repairing the mating device at Plant Hatch, in the amount of \$52,014.44. See ECF No. 141-1 (“Hatch Holtec Mating Device Repair”).

B. Plant Vogtle’s Dry Storage Program

Georgia Power claims five categories of damages related to Plant Vogtle’s dry storage program in this round of litigation including: (1) modifications to the fuel handling building; (2) overhead cask handling crane; (3) sally port; (4) 2014 fuel sipping campaign; and (5) dry storage engineering. See ECF No. 224 at 55-140. Georgia Power’s alleged damages for these categories are as follows:

Fuel Handling Building Modifications:	\$6,318,677.40
Overhead Cask Handling Crane:	\$5,703,010.27
Sally Port:	\$7,242,557.29
2014 Fuel Sipping Campaign:	\$805,873.50
Dry Storage Engineering:	\$1,741,478.00
	<hr/>
Total:	\$21,811,596.46

See ECF No. 224 at 26. The court will address each category, in turn.

1. Modifications to the Fuel Handling Building

Georgia Power made a series of modifications to the Fuel Handling Building at Plant Vogtle during the damages period at issue in this case, including to the: (1) cask loading pit pedestal; (2) cask loading pit seismic restraint system; (3) cask loading pit temporary walkway; (4) cask washdown area pedestal; (5) cask washdown area seismic restraints; (6) cask washdown area scaffolding staircase; (7) cask washdown area step-over grating; (8) cask washdown area work platform; (9) cask washdown area electrical receptacles; (10) lift yoke stand; (11) lift yoke storage arm; (12) concrete pad outside fuel handling building; (13) small bore piping for helium in fuel handling building; (14) cask washdown area demineralized water system; (15) boron concentration analysis; and (16) removable cask loading pit lights. See ECF No. 224 at 55-92.

(a) Cask Loading Pit Pedestal

During the cask loading process, the HI-TRAC transfer casks sit on a custom-designed pedestal in the cask loading pit to ensure that the casks are at the appropriate

height. See ECF No. 165 at 58, 59, 60 (Tr. 720:5-24, 721:21-23, 722:1-9 (Cash)); see also ECF No. 168 at 99 (Tr. 1284:6-15 (Supko)). The pedestal was made to specifically match the design of the HI-TRAC casks. See id. at 100-01 (Tr. 1285:3-1286:5 (Supko)). Defendant does not dispute that the pedestal cost Georgia Power \$275,000. See ECF No. 141-1 (“Cask Loading Pit Pedestal”).

The dispute here is not whether the pedestal was necessary, or whether the cost was appropriate; rather, defendant argues that Georgia Power has not demonstrated that “if DOE had performed as required, the pedestal would not have been needed.” ECF No. 229 at 38 (citing Energy Nw., 641 F.3d at 1307 (“If a cost would have been incurred even in the non-breach world, it is not recoverable.”)). The DOE has not identified the cask it would have used in the non-breach world, but Mr. Warren Brewer, defendant’s technical expert, testified at trial that it is “reasonable to assume that ‘something like the BR-100’—one of the large rail casks being developed by DOE in the early 1990s—would have been used for performance.” Id. at 39 (quoting ECF No. 173 at 52-53 (Tr. 2109:17-2110:5 (Brewer))). Mr. Brewer also testified that the government would not have used the HI-TRAC casks used by Georgia Power. See ECF No. 173 at 195 (Tr. 2252:15-22 (Brewer)).

Defendant contends that Georgia Power should not recover for the cost of the pedestal because the HI-TRAC casks and the BR-100 casks are similar in size, and thus a cask that is “something like the BR-100” would require a pedestal of similar height to the pedestal purchased by Georgia Power. See ECF No. 229 at 39; ECF No. 173 at 52-53 (Tr. 2109:17-2110:5 (Brewer)). Mr. Brewer testified at trial, however, that Georgia Power might need to buy a different pedestal when the DOE eventually performs. See ECF No. 173 at 59-60 (Tr. 2116:7-2117:3 (Brewer)).

As Georgia Power correctly notes, defendant’s “challenge to this pedestal is pure speculation about the unknown dimensions of the future DOE cask and future pedestal costs.” ECF No. 224 at 59. While it is true that Georgia Power bears the burden of proving “the extent to which [its] incurred costs differ from the costs [it] would have incurred in the non-breach world,” Energy Nw., 641 F.3d at 1306, its inability to make that comparison is a direct result of the DOE’s breach and its subsequent failure to identify the cask it would have used or intends to use in the future. See Locke v. United States, 151 Ct. Cl. 262, 267 (1960) (“The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable.”).

Accordingly, Georgia Power is entitled to recover \$275,000 for the cost of the cask loading pit pedestal.

(b) Cask Loading Pit Seismic Restraint System

Plant Vogtle also purchased a seismic restraint system for the cask loading pit because the plant is in an “active seismic zone,” and it is “part of [the plant’s] process” to evaluate all equipment for earthquake safety. ECF No. 164 at 129 (Tr. 648:13-15 (Cash)); ECF No. 165 at 69 (Tr. 731:6-16 (Cash)). Mr. Brewer agreed that the seismic restraints were necessary. See ECF No. 173 at 60 (Tr. 2117:4-23 (Brewer)).

Like the pedestal, the seismic restraint system was custom-designed for the HI-TRAC casks at Plant Vogtle. See ECF No. 165 at 71-73 (Tr. 733:25-735:12 (Cash)). Plaintiffs noted, however, that “the restraints were not because of the HI-TRAC,” and “any cask that you’re putting on a pedestal [at Plant Vogtle] is going to require some sort of seismic restraint.” Id. at 182 (Tr. 844:15-25 (Cash)). Defendant does not dispute that the seismic restraints cost \$1,346,127.75. See ECF No. 141-1 (“CLP HI-TRAC Seismic Restraint System”).

As with the cask loading pit pedestal, defendant argues that it is not responsible for the cost of the restraints because Georgia Power would have incurred the cost in the non-breach world. See ECF No. 229 at 40-41. Put another way, defendant contends that plaintiff has not proven causation. The court disagrees.

Mr. Brewer has testified that the government would not have used the HI-TRAC casks used by Georgia Power. See ECF No. 173 at 195 (Tr. 2252:15-22 (Brewer)). Ms. Eileen Supko, plaintiffs’ technical expert, testified—and defendant does not dispute—that the seismic restraint system was custom-designed for the HI-TRAC casks. See ECF No. 168 at 99-104 (Tr. 1284:16-1289:16 (Supko)). It follows directly, then, that plaintiff would not have needed these restraints had the DOE performed under the contract.

Defendant’s argument that plaintiff has failed to prove causation because it would have purchased seismic restraints of some description in the non-breach world is unavailing. While it appears likely that seismic restraints would be required for any cask the DOE might choose, see ECF No. 165 at 182 (Tr. 844:15-25 (Cash)), such an assessment necessarily requires speculation because the DOE has yet to identify the cask system it will use when it performs. Moreover, the DOE may not avoid liability for damages by making the information about the non-breach world “unobtainable” to plaintiffs. Locke, 151 Ct. Cl. at 267.

Accordingly, Georgia Power is entitled to recover \$1,346,127.75 for the cost of the cask loading pit seismic restraint system.

(c) Cask Loading Pit Temporary Walkway

Georgia Power also seeks damages for the costs related to designing and building a temporary walkway over the cask loading pit. See ECF No. 224 at 62. In 2009, Georgia Power determined that the DOE would fail to collect spent nuclear fuel before on-site storage was necessary, and began making plans for dry storage. See ECF No. 165 at 227-30 (Tr. 889-92 (Cash)). It was critical that Plant Vogtle complete preparations for dry storage before the presence of excess spent fuel created operational complications, including interruptions in electricity generation. See id. Due to the time-sensitive nature of the work, Georgia Power moved on “parallel paths on some parts of the project and contingency plans.” ECF No. 224 at 64 (citing ECF No. 168 at 105-08 (Tr. 1290-93 (Supko))).

The cask loading pit temporary walkway was one such contingency plan to guard against the risk that “the tool used for moving spent fuel rods from the pool into the MPC might not reach the cask if the cask pedestal being designed and built by Holtec was a little on the short side.” Id. (citing ECF No. 165 at 83-84 (Tr. 745-46 (Cash))). The temporary walkway “would have assured that [workers] had the reach they needed for the tool used for loading.” Id. (citing ECF No. 165 at 84-85 (Tr. 746:13-747:5 (Cash))). Georgia Power anticipated that designing and building the walkway would require eight weeks. See ECF No. 165 at 84-85 (Tr. 746:13-747:5 (Cash)); see also id. at 184-85 (Tr. 846:14-847:8 (Cash)) (stating that if accurate drawings had been available, “it would have taken less than eight weeks”). Although the walkway was ultimately not needed, id. at 184 (Tr. 846:7-13 (Cash)), Georgia Power spent \$471,515 planning for this contingency, see ECF No. 141-1 (“FHB Temporary Cask Loading Pit Walkway”).

A non-breaching party is obligated to mitigate its damages when “a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage.” Indiana Michigan, 422 F.3d at 1375. When mitigation efforts are “reasonable, foreseeable, and caused by the Government’s partial breach, their ultimate success and usage is irrelevant.” Yankee Atomic, 536 F.3d at 1276. See also Entergy Nuclear, 95 Fed. Cl. at 184) (“Efforts to demonstrate the plaintiffs failed to make the best choice in mitigating damages are considered irrelevant.”).

According to defendant, plaintiffs should not recover mitigation damages for the temporary walkway for two reasons. First, the need for a contingency plan was a consequence of plaintiff’s unusual lack of confidence in the plant’s dimensional data. See ECF No. 169 at 93 (Tr. 1466:13-17 (Supko)); see also ECF No. 165 at 184 (Tr. 846:14-847:8 (Cash)) (stating that if plaintiff “had the accurate drawings, it would have taken less than eight weeks” to determine if the walkway was necessary). Defendant contends that its breach is unrelated to the state of the plant’s dimensional drawings, and thus did not cause the need for a contingency plan. See ECF No. 229 at 42. In addition, defendant’s expert testified that plaintiff’s plan was unreasonable because it had other,

less costly, mitigation options. See id. at 43 (explaining that plaintiff could have made additional calculations or positioned the cask in a different place).

As an initial matter, defendant's causation argument fails to focus on the relevant relationship. The court agrees with defendant that "the accuracy of the Vogtle plant's drawings—including the dimensional data—has nothing to do with DOE's performance." Id. at 42. Certainly, the DOE's breach did not cause concern regarding the data's accuracy. The question here, however, is whether the breach caused the need for a contingency plan. Plaintiff implemented the contingency plan after determining that the DOE would not perform prior to Plant Vogtle's need for dry storage in order to avoid operational complications. See ECF No. 165 at 227-30 (Tr. 889-92 (Cash)). Had defendant performed, plaintiff would not have been in such a position. For this reason, defendant's breach is properly viewed as a substantial cause of plaintiff's need for a contingency plan.

Furthermore, both plaintiff's expert and its dry storage program manager testified that the contingency plan was reasonable under the circumstances. See ECF No. 168 at 105-08 (Tr. 1290:18-1293:11 (Supko)) ("Given the uncertainty with respect to whether or not they would be able to utilize the long-handled spent fuel tool and the critical path schedule that not designing and fabricating this walkway would have presented to them, it was reasonable."); ECF No. 165 at 84-85 (Tr. 746:13-747:17 (Cash)) ("If we had waited until the campaign . . . , we would have lost our campaign in 2013 by the time we could have designed and built it," and "we would have then been looking at losing full core offload capability the following year."). Defendant's expert may be correct that plaintiff had additional, and perhaps even superior, mitigation options. See ECF No. 229 at 42. In the court's view, however, plaintiff has shown by a preponderance of the evidence that the option it chose was a reasonable one under the circumstances critical to the plant's continued operation. See Entergy Nuclear, 95 Fed. Cl. at 184 ("Efforts to demonstrate the plaintiffs failed to make the best choice in mitigating damages are considered irrelevant.").

Accordingly, Georgia Power is entitled to recover \$471,515 for the cask loading pit temporary walkway.

(d) Cask Washdown Area Pedestal

After loading spent fuel assemblies into a HI-TRAC cask in the cask loading pit, the HI-TRAC is moved to the cask washdown area where the MPC is closed. See ECF No. 168 at 70-71 (Tr. 1255:4-1256:3 (Supko)). While the HI-TRAC is in the cask washdown area, the cask sits on a second, unique pedestal. See ECF No. 165 at 94-95 (Tr. 756:5-757:2 (Cash)). Like the pedestal in the cask loading pit, the pedestal in the washdown area is custom-designed to fit the precise contours of the HI-TRAC and to "prevent any horizontal movement of the HI-TRAC during an earthquake." Id. at 95-96

(Tr. 757:19-758:2 (Cash)). The pedestal also serves to ensure that the MPC is at an accessible height for closing operations. See ECF No. 168 at 111-12 (Tr. 1296:19-1297:21 (Supko)). The cask washdown area pedestal cost \$180,000. See ECF No. 141-1 (“Cask Washdown Area Pedestal”).

As with the cask loading pit pedestal, defendant’s argument here relates to causation. It contends that plaintiff has “not demonstrated that [it] would not have installed a pedestal in the cask washdown area in the non-breach world where fuel was loaded into a DOE-supplied transport cask rather than Holtec storage casks,” therefore, “[t]his cost is not recoverable.” ECF No. 229 at 45. Defendant criticizes plaintiff for not analyzing “whether the pedestal in the cask washdown area would have been needed to load a DOE-suppl[ied] cask in the non-breach world,” but fails to indicate how such an assessment could be meaningfully conducted given that the DOE has not identified the cask it would use in the non-breach world. See id. at 43.

Defendant notes that Mr. Cash “confirmed [that] a cask’s height determines the need to use the pedestal in the washdown area.” Id. (citing ECF No. 165 at 181 (Tr. 843:16-21 (Cash))). It also states that Ms. Supko “admitted that, depending on the height of a DOE-supplied cask, it may or may not require a pedestal.” Id. (citing ECF No. 169 at 87 (Tr. 1460:17-21 (Supko))). Ms. Supko and Mr. Brewer differed with regard to whether and how the required cask height would be affected by the closing mechanism—welding or bolts—on a particular cask. See ECF No. 229 at 44 (citing various passages of differing expert testimony). And Mr. Brewer testified that he “had ‘no reason to believe that the cost’ to install a pedestal specifically for a DOE-supplied cask ‘would be in any way substantively different’ than the actual world.” Id. at 45 (citing ECF No. 173 at 66, 71-73 (Tr. 2123:17-22, 2128:20-2130:6 (Brewer))).

Defendant’s discussion is, however, untethered from any real information about the cask it would have provided. See id. at 43-45. Because defendant has not provided that information, it has deprived plaintiff of the ability to make the direct comparison defendant insists it should make. Defendant cannot benefit from its own failure in this regard. See Locke, 151 Ct. Cl. at 267 (“The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable.”).

The court finds that Georgia Power installed the cask washdown area pedestal, which is custom-designed to fit with the HI-TRAC casks, because of defendant’s breach, and is therefore entitled to recover \$180,000. See ECF No. 141-1 (“Cask Washdown Area Pedestal”).

(e) Cask Washdown Area Seismic Restraints

In addition to the pedestal, Georgia Power installed seismic restraints in the cask washdown area to prevent the HI-TRAC cask from tipping as a result of seismic activity. See ECF No. 165 at 76-77 (Tr. 738:16-18, 738:25-739:6 (Cash)). As with the restraints in the cask loading pit, these restraints were custom designed for Plant Vogtle to use with the HI-TRAC casks. See id. at 78-79 (Tr. 740:18-741:10 (Cash)); see also id. at 241 (Tr. 903:11-23 (Cash)) (testifying that it would be “highly unlikely” that a cask other than the HI-TRAC casks used at Plant Vogtle could use the same seismic restraints). Georgia Power spent \$1,247,077 to procure the cask washdown area seismic restraints. See ECF No. 141-1 (“CWA HI-TRAC Seismic Restraint System”).

Defendant makes essentially the same argument with regard to the restraints in the cask washdown area as it did with regard to the restraints in the cask loading pit. The court, likewise, reaches the same conclusion. Defendant argues that it is not responsible for the cost of the restraints because Georgia Power would have incurred the cost in the non-breach world. See ECF No. 229 at 40-41. Absent more specific information about the cask the DOE would have chosen in the non-breach world, however, the court cannot make that determination. The evidence tends to prove that the custom-designed restraints are unlikely to be compatible with any other cask, and as such, if the DOE does in fact perform and if the casks it chooses require restraints, the cost will be incurred again.

Accordingly, the cost of the cask washdown area seismic restraints is properly considered part of the breach damages in this case, and Georgia Power is entitled to recover \$1,247,077. See ECF No. 141-1 (“CWA HI-TRAC Seismic Restraint System”).

(f) Cask Washdown Area Scaffolding Staircase

Georgia Power also constructed a scaffolding staircase in the cask washdown area to accommodate the dry storage process. See ECF No. 165 at 89 (Tr. 751:2-13 (Cash)). The staircase provided more safety and stability than the existing ladder for the increased number of workers in the area during closure activities. See id. Georgia Power spent \$242,388 to replace the ladder with the scaffolding staircase. See ECF No. 141-1 (“Ladder Access to the FHB CWA Modification”). It also incurred costs of \$22,386.03 to construct temporary scaffolding for use before the stairs were complete. See ECF No. 141-1 (“Scaffold in FHB Unit 2 Spent Fuel Pool Area”); ECF No. 224 at 72 n.45.

Ms. Supko testified that plaintiff would not have installed the staircase in the non-breach world because it was constructed specifically to accommodate the HI-TRAC casks. See ECF No. 168 at 126 (Tr. 1311:6-9 (Supko)). The design of the cask makes it necessary for workers to frequently move between two elevations during closure activities, and specifically to operate the forced helium dehydration system permanently installed on the top level and to weld the cask. See id. at 126, 127-28 (Tr. 1311:1-25,

1312:15-1313:12 (Supko)). Ms. Supko further opined that any DOE-provided cask would use vacuum dehydration and therefore would not such require ready access to multiple elevations. See id. at 128 (Tr. 1313:13-19 (Supko)).

Defendant agrees that the existing ladder was a safety hazard, but argues that the new staircase would have equally benefitted workers during closure activities on a DOE-provided cask, even if forced helium dehydration and welding were not required. See ECF No. 229 at 46. Mr. Brewer testified that closing a DOE-provided cask would involve bolting approximately forty-eight bolts in a deliberate and repeated pattern that would “require [workers] to be up on top of the cask for not insignificant amounts of time.” ECF No. 173 at 81-82 (Tr. 2138:14-2139:1 (Brewer)).

In its reply, plaintiff asserts—without citation to the record—that “Mr. Brewer’s observation that workers for a DOE cask would have to deal with 48 bolts is irrelevant. Those bolts would not involve workers at the higher elevations in the [cask washdown area].” ECF No. 232 at 33.

The court finds that Georgia Power has failed to carry its burden to show that it is more likely than not that the staircase would not have been as useful in the non-breach world as it was in the actual world. Defendant’s expert testified that both procedures for closing casks would require workers to spend a material amount of time on top of the casks. See ECF No. 173 at 81-82 (Tr. 2138:14-2139:1 (Brewer)). Georgia Power’s assertion to the contrary lacked any evidentiary support, and thus the court does not find it persuasive.

Accordingly, Georgia Power is not entitled to recover \$22,386.03 for the cost of installing the scaffolding staircase or the associated temporary scaffolding. See ECF No. 141-1 (“Scaffold in FHB Unit 2 Spent Fuel Pool Area”).

(g) Cask Washdown Area Step-Over Grating

In order to allow workers safe access to the forced helium dehydration system used in closing HI-TRAC casks from the top of the cask washdown area, Georgia Power installed two platforms made of step-over grating for safety reasons. See ECF No. 165 at 92-93 (Tr. 754:12-755:23 (Cash)). The platforms cost \$427,279. See ECF No. 141-1 (“AB Elevator/Stairwell Platform/FHD Skids”).

Defendant agrees that the platforms “were constructed for worker safety,” but contends that “the [drying] system brought by DOE would have just as likely been stored where the [forced helium dehydration system] currently is located.” ECF No. 229 at 47 (citing ECF No. 173 at 78-79 (Tr. 2135:21-2136:3 (Brewer))).

Ms. Supko opined that the platform would not have been installed in the non-breach world because the vacuum-drying system would not have been permanently installed in the non-breach world, and thus would have been staged at a lower level on existing platforms. See ECF No. 168 at 128-29 (Tr. 1313:13-1314:11 (Supko)). Pursuant to the Standard Contract, the DOE would have provided the vacuum-drying system along with the casks, and after the casks were closed, the DOE would have removed the system from the plant. See id.

Even accepting that the DOE equipment could have been stored on the top level of the cask washdown area making construction of the platforms a reasonable safety precaution in the non-breach world, the court credits Ms. Supko's opinion that the temporary nature of the vacuum-drying equipment makes that course less likely.

Accordingly, the court finds that Georgia Power has shown, by a preponderance of the evidence, that it would not have incurred the costs of the step-over grating platforms in the non-breach world, it is entitled to recover \$427,279. See ECF No. 141-1 ("AB Elevator/Stairwell Platform/FHD Skids").

(h) Cask Washdown Area Work Platform

Georgia Power also constructed a cask washdown area work platform, which cost \$515,751. See ECF No. 141-1 ("AB Elevator/Stairwell Platform Modification"). Ms. Supko explained at trial that the work platform was necessary at the top level of the cask washdown area to allow the "hands-on access" required to set and check the automatic welds on the HI-TRAC casks. See ECF No. 224 at 76 (citing ECF No. 168 at 134-35 (Tr. 1319:19-1320:16 (Supko))). According to Ms. Supko, the same level of access would not be required for vacuum-drying and bolting closed DOE-provided casks. See ECF No. 168 at 135 (Tr. 1320:1-16 (Supko)); see also ECF No. 232 at 37.

As with the step-over grating platforms, defendant argues that the work platform would be "equally valuable" in the actual and non-breach worlds. ECF No. 229 at 48. Mr. Brewer insisted, again, that the same safety concerns would exist with DOE-provided equipment as with the HI-TRAC casks. See id. (citing ECF No. 173 at 80 (Tr. 2137:6-16 (Brewer))).

Again, even accepting Mr. Brewer's assessment, the court finds that Georgia Power would have been less likely to fabricate and install new platforms to accommodate temporary equipment when the existing platforms were workable.

Accordingly, Georgia Power is entitled to \$515,751 for the cask washdown area work platform. See ECF No. 141-1 ("AB Elevator/Stairwell Platform Modification").

(i) Cask Washdown Area Electrical Receptacles

Georgia Power installed 120-volt AC power receptacles at the top of the cask washdown area to allow Holtec technicians to perform welding, forced helium dehydration, and other MPC closure activities. See ECF No. 165 at 104-05 (Tr. 766:16-767:12 (Cash)). The location of the new receptacles reduced radiation exposure by minimizing the time workers were required to spend near the top of the MPC, where radiation levels are highest. See id. at 105-06 (Tr. 767:10-768:7 (Cash)). The receptacles were also, however, installed for “convenience” and were not dedicated power sources. Id. at 186-87 (Tr. 848:12-849:8 (Cash)). Installation of the receptacles cost \$185,866. See ECF No. 141-1 (“120VAC Power Distribution System”).

Defendant argues, as with the cask washdown area platforms, that the receptacles would have been equally useful in the non-breach world to support the closure activities associated with DOE-provided casks. See ECF No. 229 at 50. Georgia Power insists, however, that because the closure activities would occur on the lower platforms where receptacles were already installed in the non-breach world, there would be no reason to install receptacles on the top level. See ECF No. 224 at 77 (citing ECF No. 168 at 135-37 (Tr. 1320:22-1322:12 (Supko))); ECF No. 165 at 105 (Tr. 767:13-21 (Cash)). Having previously found that it is more likely that the DOE-provided equipment would be staged on the lower platforms, the court agrees with plaintiff.

Accordingly, Georgia Power is entitled to recover \$185,866 for the installation of 120-volt electrical receptacles. See ECF No. 141-1 (“120VAC Power Distribution System”).

(j) Lift Yoke Stand

To move the transfer casks, Georgia Power purchased a lift yoke that was specifically designed for use with the HI-TRAC casks. See ECF No. 165 at 135 (Tr. 797:1-21 (Cash)); see also ECF No. 173 at 96 (Tr. 2153:10-25 (Brewer)) (explaining that a lift yoke is a device that attaches the crane hook to the cask). The lift yoke, when not in use, is stored on a stand. See ECF No. 165 at 133-34 (Tr. 795:2-18, 796:1-10 (Cash)). In response to interrogatories, the DOE stated that in the non-breach world it would “not have provided a lift yoke stand because the need for a lift yoke stand would have been determined by the unique needs of the specific plant.” DX 104 at 15. The lift yoke stand cost \$19,025.62. See ECF No. 141-1 (“HI-TRAC Lift Yoke Stand”).

Georgia Power argues that the DOE would have provided a stand, or its functional equivalent, in the non-breach world because it would be necessary both for transporting the lift yoke securely and for positioning it to engage with the crane at the plant. See ECF No. 224 at 79-80; ECF No. 232 at 38-40. Ms. Supko testified to this, stating that “a lift yoke stand would have been necessary in order to safely transport the lift yoke in an

upright position.” ECF No. 169 at 79 (Tr. 1452:5-7 (Supko)). See also ECF No. 168 at 140-41 (Tr. 1325:18-1326:11 (Supko) (stating that the “obvious way to do that is for it to be transported with its lift yoke stand”). She also testified that “when the lift yoke is not in use, it’s necessary to safely store it, and it’s necessary to store it in an upright position, so that the cask crane can interface with the top of the lift yoke,” id. at 139 (Tr. 1324:14-17 (Supko)), and “the lift yoke stand accomplishes that,” id. (Tr. 1324:22-23 (Supko)).

Georgia Power further contends that the language of the Standard Contract supports this position. Pursuant to the Standard Contract, the DOE is obligated to “arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser’s site to the DOE facility Such cask(s) shall . . . be accompanied by pertinent information including, but not limited to, the following: . . . equipment, . . . and consumables needed to use . . . the cask(s)” JX 1 at IV.B.2.

Defendant asserts that the stand is plant-specific equipment, and that in the non-breach world, the DOE would have sent drawings of the lift yoke to the plant so that plaintiff could procure a compatible stand. See ECF No. 229 at 51 (citing DX 104 at 15). Mr. Brewer also concedes that the lift yoke stand at issue here was “specifically designed for the lift yoke used with the Holtec HI-TRAC.” ECF No. 224 at 78 (citing ECF No. 173 at 243 (Tr. 2300:7-11 (Brewer))).

In the court’s view, Georgia Power has not carried its burden to show that the DOE would have provided a lift yoke stand in the non-breach world. Ms. Supko credibly asserts that a stand would be a sensible way to both transport and store the lift yoke, but it is not clear to the court that it is the only way to do so. The contract language quoted by Georgia Power obligates the DOE to provide equipment necessary to “use . . . the cask(s)” it provides. JX 1 at IV.B.2. While the lift yoke itself is clearly required to use the casks, Georgia Power has not demonstrated that it is more likely than not that the storage mechanism for the lift yoke should be categorized the same way.

Accordingly, Georgia Power is not entitled to recover \$19,025.62 for the cost of the lift yoke stand. See ECF No. 141-1 (“HI-TRAC Lift Yoke Stand”).

(k) Lift Yoke Storage Arm

The lift yoke stand was not the initial storage solution for the lift yoke. Georgia Power first planned to use a storage arm mounted on the wall at Plant Vogtle, as it had done successfully at Plant Farley. See ECF No. 165 at 136 (Tr. 798:1-25 (Cash)). Ultimately, though, a structural analysis concluded that the wall might fail in a seismic event, and the arm could not be used. See id.; see also id. at 179 (Tr. 841:13-15 (Cash)) (characterizing the failed effort as an “oops” moment). The parties have stipulated that the storage arm cost \$148,500. See ECF No. 141-1 (“Lift Yoke Wall Storage Arm”).

For the same reason that the court finds plaintiff cannot recover in this case for the cost of the lift yoke stand, the court finds that plaintiff has not carried its burden with regard to the lift yoke storage arm. It is simply not clear to the court, based on the evidence before it, that the DOE was obligated to provide a storage mechanism for the lift yoke. Absent that obligation, defendant is not responsible for the cost.

Accordingly, Georgia Power is not entitled to recover \$148,500 for the cost of the lift yoke storage arm. See ECF No. 141-1 (“Lift Yoke Wall Storage Arm”).

(l) Concrete Pad Outside Fuel Handling Building

Outside the fuel handling building at Plant Vogtle, Georgia Power built a concrete pad to stage helium for the forced helium dehydration system used in removing moisture before closing canisters for dry storage. See ECF No. 165 at 102, 103-04 (Tr. 764:5-13, 765:20-766:6 (Cash)). By locating the pad outside the bay doors of the building, Georgia Power gained efficiencies related to the number of personnel and steps needed to meet decontamination requirements that would otherwise be implicated by bringing the helium inside. See id. at 102-03 (Tr. 764:14-765:13 (Cash)). The concrete pad cost \$307,109 to construct. See ECF No. 141-1 (“AB Exterior Concrete Pad”).

Defendant recognizes the benefits of staging the helium outside the fuel handling building and concedes that it was a reasonable decision on Georgia Power’s part. See ECF No. 229 at 54. Mr. Brewer testified that “[s]taging the helium outside of the building, as plaintiffs did, [was] not ‘absolutely necessary’ but ‘a matter of convenience’ that was entirely reasonable—‘to not have to drag helium bottles into the plant up to the areas where I need it and just be dealing with that harassment.’” Id. (quoting ECF No. 173 at 109 (Tr. 2166:19-25 (Brewer))). Nevertheless, defendant argues that plaintiff should not recover the costs because for the “same reasons, plaintiffs would have staged helium outside the building for DOE pick-up in the non-breach world.” Id. (citing ECF No. 173 at 109 (Tr. 2166:19-2167:6 (Brewer))).

Plaintiff argues that it is “illogical and incorrect to suggest that [plaintiff] would have made any efforts or expenditures to make permanent modifications in the Plant Vogtle’s Auxiliary Building for the [g]overnment-owned equipment used in the vacuum drying process for a DOE cask.” ECF No. 232 at 43.

The parties agree that the DOE would use helium in loading DOE-provided casks. See ECF No. 229 at 54. They further agree that the DOE would provide its own vacuum-drying equipment and helium supply pursuant to the Standard Contract. See id. at 54-55; ECF No. 232 at 43. Thus, because the equipment and helium would be DOE-provided, it “would leave the site along with the loaded DOE cask.” Id. (citing ECF No. 168 at 128-29 (Tr. 1313:20-1314:11 (Supko))).

While the court understands the benefit of staging helium outside the fueling handling building, it is not clear why Georgia Power would go through the trouble and expense of doing so in the non-breach world. As with the cask washdown pit platforms, the temporary nature of the equipment at issue makes it less likely that Georgia Power would have made permanent modifications to the plant to accommodate it.

Accordingly, the court finds that Georgia Power has shown, by a preponderance of the evidence, that it would not have incurred this expense in the non-breach world, and is entitled to recover \$307,109 for construction of the concrete pad outside the fuel handling building. See ECF No. 141-1 (“AB Exterior Concrete Pad”).

(m) Small Bore Piping for Helium in Fuel Handling Building

The helium stored on the concrete pad was connected to the forced helium dehydration system used in the cask washdown area through small bore piping. See ECF No. 165 at 104 (Tr. 766:7-10 (Cash)). The small bore piping cost \$469,736.50 to install. See ECF No. 141-1 (“New Non-Safety Related Small Bore Piping for Helium”).

For the same reason that the court finds Georgia Power is entitled to recover for the cost of the concrete pad outside the fuel handling building, it finds that plaintiff can recover for the small bore piping to bring that helium into the building for use in the forced helium dehydration system. Georgia Power has demonstrated, by a preponderance of the evidence, that it is unlikely to have made permanent building modifications to accommodate the DOE’s equipment while it would have been temporarily on-site.

Accordingly, Georgia Power is entitled to recover \$469,736.50 for the installation of small bore piping. See ECF No. 141-1 (“New Non-Safety Related Small Bore Piping for Helium”).

(n) Cask Washdown Area Demineralized Water System

When a cask is removed from the cask loading pit, it is decontaminated with demineralized, “very pure water.” ECF No. 165 at 82, 83 (Tr. 744:13-15, 745:3 (Cash)). Loaded HI-TRAC canisters are now decontaminated over the spent fuel pool, but prior to the post-breach dry storage operations, there was piping that allowed for decontamination in the cask washdown area. See id. at 86, 87 (Tr. 748:5-7, 749:5-13 (Cash)). The pipes in the cask washdown area “stuck out so far that [Georgia Power] would not be able to move a HI-TRAC into that area.” Id. at 86 (Tr. 748:14-15 (Cash)). As such, the pipes could no longer be used and were modified to accommodate the HI-TRAC transfer cask in the cask washdown area. See id. at 86, 87 (Tr. 748:16-17, 749:14-750:1 (Cash)). Georgia Power also acknowledged that the casks are decontaminated over the pool in order to minimize radiation exposure and contamination, and that they generally do not

use the cask washdown area. See ECF No. 170 at 155-56 (Tr. 1812:22-1813:2 (Loftin)); ECF No. 165 at 191 (Tr. 853:9-13 (Cash)). The alterations to the demineralized water system in the cask washdown area cost \$413,156.50. See ECF No. 141-1 (“Demineralized Water System in Cask Washdown Area”).

Defendant argues that Georgia Power should not recover the cost of altering the demineralized water system for two reasons. First, defendant suggests that because plaintiff now decontaminates casks over the spent fuel pool, it should not recover the costs of the system it does not use. See ECF No. 229 at 56-57. Defendant acknowledges, however, that Georgia Power “cut and capped the pipes to fit the Holtec HI-TRAC cask.” Id. at 56. When mitigation efforts are “reasonable, foreseeable, and caused by the Government’s partial breach, their ultimate success and usage is irrelevant.” Yankee Atomic, 536 F.3d at 1276. As such, the court will not fault Georgia Power for evolving its decontamination process as better and safer methods are developed.

Defendant next asserts that Georgia Power would have had to modify the pipes in the non-breach world to accommodate a DOE-provided cask. See ECF No. 229 at 57. Mr. Brewer testified to estimates for both the size of the cask the DOE would provide and the size of the available opening to the cask washdown area. He assumed that a large rail cask would be between eighty-four and ninety-six inches in diameter. See ECF No. 173 at 90 (Tr. 2147:7-12 (Brewer)). He then deduced from looking at a picture of the cask washdown area that the narrowest opening was “somewhere between 32 and 41 inches.” Id. at 89-90 (Tr. 2146:23-2147:1 (Brewer)). He further estimated that the opening in the middle of the piping was approximately seventy-two inches. See id. at 90 (Tr. 2147:19-24 (Brewer)). Mr. Brewer arrived at his estimates by comparing the desired measurements with “things I know the size of in the picture.” Id. He testified that, based on this visual assessment, “the pipes have to go no matter whether it’s a DOE cask or a dry storage cask.” Id. at 90-91 (Tr. 2147:25-2148:2 (Brewer)).

Georgia Power raises three challenges to Mr. Brewer’s conclusion. First, plaintiff notes that in 1990 the DOE conducted a Facility Interface Capability Assessment (FICA) at Plant Vogtle. See JX 22 (June 1990 Cask-Handling Assessment). The FICA was designed to “assess the features of a nuclear plant to help determine what kind of casks might be suitable for use at the plant site.” ECF No. 173 at 230. The report stated that, at Plant Vogtle, “access to the decontamination area is by a side opening 8 feet, 6 inches wide,” which it identified as the “most restrictive width dimension for cask handling at Vogtle.” JX 22. This would mean that a DOE-provided cask of the size estimated by Mr. Brewer would fit in the cask washdown area without modification. See ECF No. 224 at 87-88. When asked about this statement, Mr. Brewer suggested that the report lacks clarity as to what it was measuring. See ECF No. 173 at 232 (Tr. 2289:4-12 (Brewer)).

Second, Georgia Power argues that the DOE was obligated under the Standard Contract to “bring equipment suitable for use [at] the site.” ECF No. 232 at 44. The

Standard Contract states that: “DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser’s site to the DOE facility. . . . Such cask(s) shall be suitable for use at the Purchaser’s site . . .” JX 1 at IV.B.2. It appears to the court that a decision by the DOE to use casks that did not fit in the cask washdown area would conflict with this obligation. Defendant did not propose a solution to this problem.

And finally, Georgia Power notes that the testimony related to the size of the DOE-provided cask is speculative because the DOE has never provided the specific dimensions of the cask it would have used in the non-breach world. See ECF No. 224 at 87, 88; ECF No. 232 at 44-45. “Information about the exact specifications of a DOE cask would be critical to [p]laintiffs in identifying what actions may have been taken with DOE performance.” ECF No. 232 at 45. To the extent that plaintiff cannot affirmatively establish whether the DOE cask would fit in the cask washdown pit, its inability to do so is a result of defendant’s breach and its subsequent failure to identify the cask it would have used. The court will not penalize Georgia Power for defendant’s failure in this regard. See Locke, 151 Ct. Cl. at 267 (“The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable.”) (citation omitted).

Accordingly, because Georgia Power modified the piping to accommodate the HI-TRAC casks, which it was using as a result of defendant’s breach, and because defendant’s failure to identify a cask has prevented Georgia Power from making a direct comparison between the actual and non-breach worlds, Georgia Power is entitled to recover \$413,156.50 for the cost of the alterations to the demineralized water system in the cask washdown area. See ECF No. 141-1 (“Demineralized Water System in Cask Washdown Area”).

(o) Boron Concentration Analysis

Georgia Power decontaminates the HI-TRAC casks over the spent fuel pool, which dilutes the water in the cask loading pit, and as a result, it is required to test for adequate boron levels in the pool every twenty-four hours during loading. See ECF No. 165 at 83 (Tr. 745:1-9 (Cash)). The cost for boron testing during this claims period was \$25,000. See ECF No. 141-1 (“Boron Concentration Calculation”).

Despite the modifications to the cask washdown area, Georgia Power has chosen to decontaminate casks over the spent fuel pool for efficiency and to minimize radiation exposure. See, e.g., ECF No. 165 at 87, 191 (Tr. 749:5-8, 853:2-6 (Cash)); ECF No. 170 at 144, 155-56 (Tr. 1801:22-25, 1812:22-1813:2 (Loftin)); ECF No. 169 at 84 (Tr. 1457:14-21 (Supko)).

Defendant contends that Georgia Power should not recover the cost of boron concentration analysis because it would have decontaminated the casks over the spent fuel pool in the non-breach world, and thus would have incurred the cost even absent the DOE's breach. See ECF No. 229 at 60.

Georgia Power claims that “[i]f the DOE cask could have been decontaminated in the [cask washdown area], then there would have been no need [to] decontaminate a DOE cask over the spent fuel pool.” ECF No. 224 at 89 (citing Tr. 1336:10-15 (Supko)). The court, however, does not find this position persuasive. Georgia Power modified the demineralized water system in the cask washdown area to accommodate HI-TRAC casks, but ultimately decided to decontaminate the casks over the cask loading pit to reduce the risks associated with radiation exposure and contamination. See ECF No. 224 at 86, 87 (Tr. 748:16-17, 749:14-750:1 (Cash)); ECF No. 170 at 155-56 (Tr. 1812:22-1813:2 (Loftin)); ECF No. 165 at 191 (Tr. 853:9-13 (Cash)). Put another way, plaintiff chose to decontaminate casks over the spent fuel pool rather than in the cask washdown area when both were available for reasons unrelated to defendant's breach. Based on the evidence before the court, it is more likely than not that Georgia Power would have made the same decision in the non-breach world.

Accordingly, Georgia Power is not entitled to recover \$25,000 for the cost of the boron concentration analysis. See ECF No. 141-1 (“Boron Concentration Calculation”).

(p) Removable Cask Loading Pit Lights

Finally, Georgia Power procured removable lights for the cask loading pit. The underwater lights allow personnel “to see with more clarity what’s going on when [they are] moving fuel into . . . the MPC in the HI-TRAC.” ECF No. 165 at 246 (Tr. 908:9-13 (Cash)). There is, however, “nothing specific about the Holtec cask system that requires lighting in [the] loading pit.” Id. at 247 (Tr. 909:21-24 (Cash)). Rather, the lights support “worker performance and nuclear safety in that they make sure that we can see better what we’re doing and we don’t inadvertently take a fuel assembly to someplace where it doesn’t need to go or it can’t go.” Id. at 246 (Tr. 908:17-22 (Cash)). Mr. Brewer testified that “you need lights to be able to see what you are doing to make sure that when you go to insert an assembly into the cask, that you have it centered on the space in the cask you are going to put it into and that you don’t damage the assembly going in.” ECF No. 173 at 106 (Tr. 2163:18-23 (Brewer)). Mr. Brewer also characterized the lights as “equipment,” id. at 244 (Tr. 2301:17-19 (Brewer)), that is “needed to load a cask,” id. (Tr. 2301:20-25) (Brewer)). The removable lights cost \$22,760. See ECF No. 141-1 (“Cask Loading Pit Lights”).

Georgia Power argues that it should recover the cost of the lights because in the non-breach world, defendant would have been responsible for providing the lights,

pursuant to the Standard Contract. See ECF No. 224 at 91. The provision under which plaintiff claims defendant is obligated in this regard reads as follows:

DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser's site to the DOE facility. . . . Such cask(s) shall be . . . accompanied by pertinent information including, but not limited to, the following:

. . .

- (c) technical information, special tools, equipment, lifting trunnions, spare parts and consumables needed to use and perform incidental maintenance on the cask(s)[.]

JX 1 at IV.B.2.

Defendant does not fundamentally disagree about the purpose the lights serve, but rather, claims that the Standard Contract requires Georgia Power to supply them. See ECF No. 229 at 62. The provision of the contract under which defendant argues plaintiff is obligated to provide the lights requires plaintiff to “arrange for, and provide, all . . . loading activities necessary for the transportation of SNF and/or HLW to the DOE facility.” JX 1 at IV.A.2.

In the court's view, lights are more appropriately considered “equipment . . . needed to use . . . the cask(s)” than a “loading activit[y].” Id. at IV.B.2. As such, a plain reading of the contract language obligates the defendant to supply the lights. See id.

Accordingly, Georgia Power is entitled to recover \$22,760 for the cask loading pit lights. See ECF No. 141-1 (“Cask Loading Pit Lights”).

2. Cost Difference Between Repairing and Replacing Overhead Cask Handling Crane

In Plant Vogtle's fuel handling building, Georgia Power has a 125-ton overhead cask handling crane. See ECF No. 164 at 130 (Tr. 649:6-10 (Cash)). The crane is used to move spent fuel casks from the cask loading pit to the cask washdown area, and then from the cask washdown area to the railroad bay for transport. See id. (Tr. 649:20-25 (Cash)). The crane also has two hoists—an auxiliary hook and a monorail hoist—that are used for other tasks such as moving new fuel and ancillary equipment. See id. at 130-31 (Tr. 649:25-650:6 (Cash)).

The crane presently used at Plant Vogtle is not the original crane. The original crane was installed in or around 1985. See ECF No. 170 at 149 (Tr. 1806:3-5 (Loftin)).

The main hook of the original crane was designed to be used “if and when [Plant Vogtle was] able to send casks of fuel offsite,” pursuant to the Standard Contract. Id. (Tr. 1806:14-17 (Loftin)).

While using the 125-ton crane hook, plant personnel noticed that some of the bolts on the pillow block—a component of the crane that anchored the main hoist drum to the trolley structure—were elongating and breaking. See ECF No. 165 at 109 (Tr. 771:12-18 (Cash)); JX 34 at 5 (April 1986 report noting problems with crane); JX 35 at 3-7 (identifying a flawed design as the likely cause of the problems). Following an evaluation of the crane, it was de-rated from a 125-ton to 55-ton capacity “[s]ometime in the mid ‘90s.” See ECF No. 170 at 149-50 (Tr. 1806:22-1807:9, 14 (Loftin)). In addition to problems with the bolts, the crane bridge appeared to be under strain. See ECF No. 165 at 156 (Tr. 818:5-10 (Cash)) (noting “loud and uncomfortable-sounding noises” from the crane bridge when the crane moved). At the time these issues were discovered, however, Plant Vogtle was not yet lifting spent fuel casks, so there was minimal impact on plant operations. See ECF No. 170 at 150 (Tr. 1807:16-20 (Loftin)). A number of repairs were undertaken over the years, but ultimately none solved the problems. See DX 173A at 80:9-22 (Channell deposition); ECF No. 165 at 147, 167-68 (Tr. 809:10-24, 829:24-830:4 (Cash)); ECF No. 170 at 151 (Tr. 1808:7-17 (Loftin)); DX 42 at 2 (“Repair and rehabilitation were performed but the problem would recur.”).

Before dry storage operations could begin, Georgia Power needed to either repair or replace the cask handling crane. Repairing the crane was the preferred course, and was a possibility according to several vendors, but the process of repairing the crane would involve a lengthy evaluation process that risked the plant’s ability to meet the strict timeline for removing spent fuel from the pool. See ECF No. 165 at 109-10, 112 (Tr. 771:19-772:17, 774:21-25 (Cash)). The crane would need to lift dry storage casks by the second quarter of 2013, and any delays “could be disastrous for dry storage.” Id. at 110-11 (Tr. 772:14-773:7 (Cash)).

Georgia Power ultimately determined that replacing the crane was “the most reliable method to have the crane available for dry storage in 2013.” Id. at 109 (Tr. 771:19-25 (Cash)); see also id. at 110-11 (Tr. 772:25-773:7 (Cash)) (noting that the plant “had to have a fix that was guaranteed to work [the] first time”); id. at 117 (Tr. 779:1-9 (Cash)) (explaining “the risk that the schedule for repair would exceed our allowable time”); ECF No. 170 at 152-53 (Tr. 1809:23-1810:2 (Loftin)) (testifying that “there was no guarantee that any attempted repairs would be successful”). Georgia Power also hired consultants from American Crane & Equipment Corporation, which issued a report evaluating the crane, and ultimately recommended that it be replaced rather than repaired. See JX 30 at 9.

Georgia Power argues that in the non-breach world it would have repaired the crane rather than replacing it, and thus seeks damages in an amount of the difference

between the repair and replacement costs. See ECF No. 224 at 95. Georgia Power spent \$9,197,893 to replace the crane, see ECF No. 141 at 3, and estimates the cost to repair the crane in the non-breach at \$3,494,883, see PDX Y at 74-76 (plaintiffs' demonstrative exhibit reproducing information from PX 139, which was excluded from evidence in this court's November 4, 2020 evidentiary rulings order, see ECF No. 202 at 17). Thus, the difference, according to Georgia Power's expert, is \$5,703,010. See ECF No. 170 at 54-60 (Tr. 1711:18-1717:14 (Metcalf)).

At trial, the parties each presented expert testimony in an effort to prove whether Georgia Power would have repaired or replaced the crane in the non-breach world. Plaintiff's argument is as follows:

Plant Vogtle was expected to lose full core reserve by 2013. However, had the [g]overnment performed under the Standard Contract, it would have begun accepting spent fuel from Plant Vogtle in 2007, when the spent fuel pool would have contained less SNF. With less SNF in the spent fuel pool, Plant Vogtle would have had the operational flexibility to attempt a repair of the cask handling crane prior to a scheduled 2007 loading for DOE SNF acceptance, which it would have attempted because that was the lower cost option. If the repair had been unsuccessful, Plant Vogtle could have delayed the DOE loading campaign, replaced the crane, and rescheduled the loading without threatening Plant Vogtle's full core reserve.

ECF No. 224 at 95 (internal citations omitted).

The parties make extended arguments about the feasibility of repairing the crane rather than replacing it, both from technical and financial perspectives. See id. at 96-120; ECF No. 229 at 69-76, 78-80; ECF No. 232 at 49-53, 56-58. The threshold issue, however, is whether defendant's breach forced the decision to replace rather than repair the crane at the time that decision was made. In other words, the court must first address the issue of causation before reaching the distinct issue of the feasibility of repairs.

As Georgia Power acknowledged, the crane at Plant Vogtle had a long history of problems. See ECF No. 165 at 109 (Tr. 771:12-18 (Cash)); JX 34 at 5 (April 1986 report noting problems with crane); JX 35 at 3-7 (identifying a flawed design as the likely cause of the problems). Following an evaluation of the crane, it was de-rated from a 125-ton to 55-ton capacity "[s]ometime in the mid '90s." ECF No. 170 at 149-50 (Tr. 1806:22-1807:9, 14 (Loftin)). The decision to replace the crane was made approximately twenty-five years later, in 2010 or 2011. Id. at 151 (Tr. 1808:4-6) (Loftin)). In the interim, a number of repairs were undertaken, but ultimately none solved the problems. See DX 173A at 80:9-22 (Channell deposition); ECF No. 165 at 147, 167-68 (Tr. 809:10-24, 829:24-830:4 (Cash)); ECF No. 170 at 151 (Tr. 1808:7-17 (Loftin)); DX 42 at 2 ("Repair and rehabilitation were performed but the problem would recur.").

Georgia Power likewise acknowledged that the crane would have needed to be in working order in the non-breach world. As noted above, plaintiff argues that had defendant accepted spent fuel under the Standard Contract beginning in 2007, Georgia Power would have had time to attempt to repair the crane. See ECF No. 224 at 95 (citing ECF No. 165 at 118 (Tr. 780:10-13 (Cash)); ECF No. 170 at 152 (Tr. 1809:15-20 (Loftin))). “If the repair had been unsuccessful, Plant Vogtle could have delayed the DOE loading campaign, replaced the crane, and rescheduled the loading without threatening Plant Vogtle’s full core reserve.” Id.

The record before the court demonstrates that plaintiff was on notice decades before it replaced the crane that it would need to be repaired or replaced prior to any loading campaign, whether in the actual or non-breach world. And as Mr. Loftin testified at trial, fueling outages are scheduled “10, 15, [or] 20 years in advance.” ECF No. 170 at 148 (Tr. 1805:4-14 (Loftin)). As defendant notes, “[t]his means that plaintiffs knew about the 2014 refueling outage—and the corresponding desire to have ‘full core reserve’ in the pool so that new assemblies could be “staged”—since at least 2004,” nine years before the 2013 loading campaign. ECF No. 229 at 77 (citing ECF No. 170 at 148 (Tr. 1805:15-21 (Loftin))). Thus, regardless of the feasibility of the proposed repairs, the timing concern that ultimately drove the decision to elect the more expensive route of replacing the crane was caused by plaintiff’s delay in evaluating its options rather than defendant’s breach.

Georgia Power explains its decision not to attempt crane repairs earlier as a financially reasonable one. It insists that, in light of the need to implement dry storage by 2013, “Georgia Power prudently did not devote capital dollars to the cask handling crane until 2011 because it prioritized other, more pressing, capital projects.” ECF No. 232 at 55. In making this argument, plaintiff conflates the effort to evaluate its options with the cost of executing repair or replacement plans. See id. at 55-56. Plaintiff claims that it could not have known that evaluations related to repairs would take “six to nine months to complete,” before it began the process, and that defendant’s position is unreasonable because it “would have meant tying up millions of dollars in capital to go towards . . . fixing a crane that was not needed to lift 125-tons for dry cask storage until 9 years later.” Id. at 55. Plaintiff does not argue, though, that simply evaluating the problem so that plaintiff was prepared to act at the appropriate time would have caused an unmanageable outlay of capital.

In the court’s view, defendant’s breach did not cause the time constraints that plaintiff claims created the need to replace the crane without attempting the repairs that its experts argue would have been both successful and less expensive. Rather, plaintiff’s decision to delay the evaluation of its options for more than twenty years after the crane was de-rated, and with knowledge of the need to conduct a loading campaign in 2013 by at least 2004, is the reason plaintiff was unable to attempt to repair the crane before replacing it.

Accordingly, Georgia Power is not entitled to recover the difference between the repair and replacement costs for the cask handling crane.

3. Sally Port

In the last round of litigation in these cases, the court found that Georgia Power built the new sally port to accommodate dry storage activities, and that it would not have done so in the non-breach world. See Alabama Power, 119 Fed. Cl. at 632-34. Specifically, in its 2014 opinion, the court noted that, for reasons related to both safety and efficiency, defendant's arguments that Georgia Power would not have built a new sally port in the non-breach world had some logical appeal. See id. at 633. Despite this appeal, however, the court concluded that the Standard Contract did not require Georgia Power to pursue such a course. See id. The court explained its conclusion as follows:

[I]nsofar as the non-breach world is one in which the parties abide by their contractual obligations, the court finds that Georgia Power would not have been required to install a new sally port. The government is, in fact, required under the contract to deliver casks that are "suitable for use at the Purchaser's site." Plaintiffs' Ex. 4 at IV.B.2. And casks requiring expensive building modifications are, by definition, not "suitable for use at the Purchaser's site."

Id.

Since the time that Georgia Power incurred the damages awarded by the court in 2014, it has finished installing the new sally port, which is used exclusively for dry storage activities. See ECF No. 165 at 237-38 (Tr. 899:22-900:1 (Cash)). Georgia Power paid \$7,242,557.29 to complete the sally port construction. See ECF No. 141-1 ("Vogtle Sally Port").

Defendant argues that plaintiff should not recover the costs associated with completing the sally port despite the court's 2014 ruling because plaintiff has changed its position regarding the type of transportation casks the DOE would have used in the non-breach world. See ECF No. 229 at 83. In 2014, plaintiff argued that the DOE would have used truck casks that the old sally port and accompanying road could have supported. See Alabama Power, 119 Fed. Cl. at 621, 633. In the present round of litigation, Ms. Supko testified that plaintiff could have used rail casks. See ECF No. 169 at 57-58, 108 (Tr. 1430:25-1431:6, 1481:13-18 (Supko)).

This difference, in defendant's view, is so central to this case that it justifies departing from the court's 2014 decision and essentially reversing the sally port ruling. Defendant characterizes the court's previous holding as "rest[ing] on the assumption that plaintiffs would have used smaller truck casks in the non-breach world," and contends that, since plaintiff has now suggested that a rail casks would be used, the 2014 "decision

has no bearing on the court’s decision here.” See ECF No. 229 at 83 n.22. Georgia Power contends that the specifics of the cask that would have been used by the DOE—which is ultimately unknowable—is not the salient fact here, but rather that any DOE cask would have arrived at the plant through the existing security gate. See ECF No. 232 at 58-63. To demonstrate the feasibility of using the existing sally port even if the DOE used a rail cask in the non-breach world, plaintiffs cite to the trial testimony of Ms. Supko, Mr. Cash, and Mr. Loftin. See id. at 59-62 (citing various, lengthy passages in which the witnesses testify that heavy haul vehicles, such as the vehicle required to move a rail casks, could and have used the existing sally port).

In the court’s view, the type of cask used by the DOE is not determinative here. That plaintiff’s focus changed from truck casks to rail casks is not inconsistent with the fundamental ruling that the court reached in its 2014 opinion. The court’s previous decision rested firmly on the contract language that required defendant “to deliver casks that are ‘suitable for use at the Purchaser’s site.’ And casks requiring expensive building modifications are, by definition, not ‘suitable for use at the Purchaser’s site.’” Alabama Power, 119 Fed. Cl. at 633. That holding is as applicable today as it was in 2014.

As this court held in 2014, the new sally port and heavy haul road were constructed to support the Holtec casks because the existing sally port was insufficient. Id. at 632-33 (“Georgia Power built the new sally port because the existing port led to a road that could not bear the combined weight of the loaded Holtec casks and the transportation vehicles, some 600,000 pounds. The opening of the sally port was also too narrow for the large transportation vehicles required to move the loaded casks to the ISFSI.”) (internal citation omitted). This court has also determined that constructing a new sally port constitutes an “expensive building modification,” which plaintiff is not obligated to undertake pursuant to the Standard Contract. See id. at 633.

Accordingly, Georgia Power is entitled to recover \$7,242,557.29 for the costs incurred to complete the sally port construction. See ECF No. 141-1 (“Vogle Sally Port”).

4. 2014 Fuel Sipping Campaign

Pursuant to the HI-STORM Certificate of Compliance, Georgia Power must determine which spent fuel assemblies meet the criteria for dry storage through a process called fuel characterization prior to loading assemblies into the HI-STORM dry storage casks. See ECF No. 162 at 107-08 (Tr. 107:19-108:19 (Williams)). The pertinent fuel characteristics are defined by the HI-STORM Certificate of Compliance and include, for example, the physical characteristics of the fuel, the number of fuel rods, the weight of the assemblies, the fuel condition, and the time that spent fuel is cooled in the pool. See id. at 107-09 (Tr. 107:19-108:19, 108:24-109:5 (Williams)).

When evidence of possible damage is found, plant personnel must conduct additional evaluation. One method of evaluation is called fuel sipping. See ECF No. 224 at 128. Through fuel sipping, the plant can determine whether a fuel assembly is damaged, and therefore requires special handling before storage. See ECF No. 162 at 114-16 (Tr. 114:20-116:18 (Williams)). The HI-STORM Certificate of Compliance does not require Georgia Power to use fuel sipping, but does require Georgia Power to certify that the fuel is intact. See id. at 117 (Tr. 117:1-10 (Williams)). Georgia Power uses the fuel sipping method when necessary because it believes fuel sipping is the “most efficient and effective way to determine if there is a cladding defect within a fuel assembly.” Id. (Tr. 117:13 (Williams)).

The Standard Contract also requires that utilities characterize fuel as either intact or failed before loading the fuel into the DOE-provided transportation casks. See JX 4 at VI.A.1(b); see also ECF No. 162 at 132-33 (Tr. 132:19-133:23 (Williams)) (agreeing that the Standard Contract requires utilities to characterize fuel prior to pick-up). Specifically, the contract requires plaintiff to “accurately classify SNF . . . prior to delivery in accordance with paragraphs B and D of Appendix E.” JX 1 at VI.A.1(b). Paragraphs B and D of Appendix E, in turn, provide guidance for characterizing fuel as “standard,” “nonstandard,” or “failed.” JX 1 at Appendix E.A.1. As relevant here, Appendix E specifies that fuel must be “visually inspected for evidence of structural deformity or damage,” and that if damage is discovered through this process, the fuel “shall be classified as Failed Fuel.” Id. at Appendix E.A.1.B.6.a. Appendix E also requires that failed fuel be “packaged and placed in casks so that all applicable regulatory requirements are met.” Id. at Appendix E.B.6.c.

In 2014, plant personnel and Westinghouse Electric Company personnel reviewed chemistry data from past reactor cycles in advance of a dry cask loading campaign and found that it was unclear whether the pool contained damaged fuel assemblies. See ECF 162 at 110 (Tr. 110:1-18 (Williams)). To ensure that the fuel assemblies in the pool were intact, as required by the HI-STORM Certificate of Compliance, Georgia Power characterized the fuel by performing a fuel sipping campaign. See id. at 114 (Tr. 114:22-24 (Williams)); ECF No. 170 at 202 (Tr. 1859:17-25 (Loftin)).

During the fuel sipping method used in this case, “[a] fuel sipping can is placed into the spent fuel pool and a fuel assembly is loaded into the can. Then a vacuum is drawn on the can, which pulls the fission products out of any damaged fuel rods, indicating that a defect[] exists.” ECF No. 224 at 129-30 (citing ECF No. 162 at 114 (Tr. 114:4-9 (Williams))).

At the time of the fuel sipping campaign, the DOE had not provided Georgia Power with the loading or fuel characterization procedures that the DOE would require when it performs under the Standard Contract. See ECF No. 162 at 130 (Tr. 130:2-12 (Williams)). In addition, the DOE admits that the spent fuel may not be transportable in

the canisters at the time of the DOE's future performance; that decision must be made contemporaneously. See DX 104 at 50.

Georgia Power incurred costs of \$805,873.50 for the 2014 Westinghouse fuel sipping campaign. See ECF No. 141-1 ("Vogtle Fuel Sipping").

Defendant argues that plaintiff should not recover the costs for the 2014 fuel sipping campaign because it would have needed to characterize fuel in the non-breach world pursuant to the Standard Contract. See ECF No. 229 at 90-91. Plaintiff does not contest that the Standard Contract requires fuel characterization, but explains its theory of recovery as follows:

Plant Vogtle performed the fuel sipping in 2014 solely because of its requirement to ensure it was loading fuel that complied with its Holtec HI-STORM 100 dry storage system—a system that would never have been implemented if the [g]overnment had performed and picked up fuel from [p]laintiffs' plants.

The [g]overnment claims that the same fuel sipping campaign would have been performed in the non-breach world. However, rather than evaluating fuel for loading into the Holtec HI-STORM 100 system for storage of the spent fuel like [plaintiff] did in the actual world, in the non-breach world, the DOE would have delivered a transport cask that was suitable for use for transport of spent fuel from the Vogtle site.

In that case, Plant Vogtle would have qualified spent fuel for transport against the fuel characteristics required for that specific DOE transport cask. The date of the [g]overnment's performance is unknown. And, the [g]overnment has not identified what type of cask the DOE would have provided in the non-breach world or that it will provide in the future. Similarly, the DOE has never provided any loading procedures or any fuel verification procedures that utilities will have to follow. Thus, it is complete speculation to say that fuel sipping would be performed for a DOE-provided transport cask.

ECF No. 224 at 130 (internal citations omitted).

The Federal Circuit's opinion in System Fuels, Inc. v. United States, 818 F.3d 1302 (Fed. Cir. 2016), is instructive with regard to the distinction between loading fuel for storage or loading fuel for transport. In System Fuels, the Federal Circuit reviewed two SNF decisions from this court, specifically addressing the issue of damages for fuel loading costs. The Circuit held, as follows:

We agree with System Fuels that the Court of Federal Claims clearly erred in both decisions when it denied damages for costs incurred to load the storage casks and/or canisters, regardless of the type of fuel loaded. The record in both cases indicates that under the existing Standard Contracts, the DOE cannot accept for transport any of the canistered fuel as is, such that System Fuels will incur costs to unload this fuel from the storage casks and canisters and to reload it into transportation casks if and when the DOE performs.

Id. at 1306. In reaching this decision, the Circuit focused on fact that the DOE will not accept fuel in storage casks, but will require utilities to re-package fuel into transportation casks. See id. The Circuit specifically held that the trial court erred when it compared the cost of loading storage casks to the cost of loading transportation casks. See id. According to the Circuit, “the costs of loading future transportation casks, or the difference between the costs of loading these storage casks and loading transportation casks, are irrelevant to System Fuels’ entitlement to the expenses it incurred for loading these storage casks. These are expenses incurred entirely for storage due to the government’s breach.” Id. at 1307.

In the court’s view, System Fuels governs here and requires this court to award plaintiff damages for the 2014 fuel sipping campaign. Accordingly, Georgia Power is entitled to recover \$805,873.50 for the 2014 Westinghouse fuel sipping campaign. See ECF No. 141-1 (“Vogtle Fuel Sipping”).

5. Dry Storage Engineering Costs

In designing its dry storage program at Plant Vogtle, Georgia Power developed a number of unique designs, from the preliminary to final stages, with no guidance from the DOE. See ECF No. 164 at 108-09 (Tr. 627:17-628:25 (Cash)); ECF No. 165 at 14, 15-16 (Tr. 676:18-24, 677:16-678:13 (Cash)). Due to the complexity of the project, Georgia Power made changes and encountered delays in the process. See ECF No. 164 at 112-13 (Tr. 631:19-632:11 (Cash)).

Mr. Jimmy Cash testified at trial as Plant Vogtle’s certified project manager for the dry storage project. See id. at 95-96, 102 (Tr. 614:12-615:14, 621:15-18 (Cash)). Mr. Cash testified that project changes and delays are an expected part of unique projects. See id. at 110-11, 137-38 (Tr. 629:1-630:1, 656:24-657:25 (Cash)); ECF No. 165 at 9-10 (Tr. 671:25-672:6 (Cash)). The delays and changes plaintiff experienced on this project related, in large part, to the longer than expected time for Holtec to provide documents that Bechtel needed to complete its design work. See ECF No. 165 at 195, 229, 217-18, 220 (Tr. 857:7-12, 891:3-9, 879:25-880:6, 862:16-23 (Cash)). These delays resulted in the need to pursue parts of the project on parallel tracks and to re-work some designs.

See id. at 229 (Tr. 891:6-10) (Cash)); see also ECF No. 173 at 159-60 (Tr. 2216:17-2217:12 (Brewer)).

According to Mr. Cash, however, the engineering costs associated with changes or delays with the dry storage build out at Plant Vogtle were ordinary and unsurprising. See ECF No. 165 at 19-20 (Tr. 681:18-682:11 (Cash)). He also acknowledged that the project was “time-critical,” and resulted in approximately five years of work needing to be completed in three and a half years. Id. at 195 (Tr. 857:3-12 (Cash)). The engineering costs associated with changes or delays amount to \$1,741,478. See ECF No. 224 at 136 (citing DDX G-10; ECF No. 174 at 101-04 (Tr. 2424:14-2427:4 (Johnson))).

Defendant challenges these engineering costs as unreasonable, arguing that “[h]ad plaintiffs allotted sufficient time to complete the dry storage project, it would have been unnecessary to pursue tasks on parallel tracks, and costs associated with re-working designs would have been avoided.” ECF No. 229 at 96 (citing ECF No. 173 at 164-65 (Tr. 2221:19-2222:8 (Brewer))). This argument is both speculative and an impermissible attack on plaintiff’s mitigation efforts.

Dry storage was necessary and implemented at Plant Vogtle solely because of defendant’s breach. As such, the dry storage project was an effort to mitigate damage caused by defendant. To recover mitigation damages, the mitigating party must “prove foreseeability, causation, and reasonableness.” Indiana Michigan, 422 F.3d at 1376. But when mitigation efforts are “reasonable, foreseeable, and caused by the Government’s partial breach, their ultimate success and usage is irrelevant.” Yankee Atomic, 536 F.3d at 1276.

Prior to its decision in 2009 to begin building out dry storage, plaintiff intended to install additional racks in the spent fuel pool. At trial, Mr. Cash explained these plans as follows:

[Randy Bunt, Mr. Cash’s predecessor,] had been working to monitor and have [a] contingency plan . . . to ensure that we did not fill up the spent fuel pools and would end up not being able to refuel.

. . .

The primary contingency plan was to put in additional racks in the spent fuel pool. This was based on the assumption that the DOE would pick up in a reasonable amount of time and all we needed was a bridge to . . . give us a few more years. As late as 2008, it looked like that was going to happen. In 2008, the DOE submitted a license—a request to the NRC for Yucca Mountain.

...

My understanding is in 2009 that the Department of Energy started shutting down the Yucca Mountain project.

ECF No. 164 at 116-17 (Tr. 635:5-636:14 (Cash)). This testimony makes clear that the timing of plaintiff's dry storage plans was influenced by plaintiff's expectation that the DOE would perform its obligations under the contract soon after 2008. Moreover, when Mr. Cash began working on the dry storage project in 2009, a budget had been established and plans were underway for dry storage. See id. at 118 (Tr. 637:4-15 (Cash)).

In light of the circumstances, the court finds that Georgia Power reasonably and foreseeably incurred the additional engineering costs as a result of defendant's breach. In theory, plaintiff could have started the project earlier, which might have resulted in fewer costs related to delays or changes. Given the unique nature of the project, however, it is far from certain that additional time would have materially changed the costs associated with delays and changes on the project.¹⁰ And in addition to being speculative, this version of the world also ignores the reality that plaintiff was dealing with a moving target. It was responding to the DOE's apparent plans to perform under the contract, and the court will not fault plaintiff for doing so imperfectly. See Entergy Nuclear, 95 Fed. Cl. at 184 ("Efforts to demonstrate the plaintiffs failed to make the best choice in mitigating damages are considered irrelevant.").

Accordingly, Georgia Power is entitled to the engineering costs associated with changes or delays in an amount of \$1,741,478. See ECF No. 224 at 136 (citing DDX G-10; ECF No. 174 at 101-04 (Tr. 2424:14-2427:4 (Johnson))).

C. Plant Farley

On June 13, 1983, the government entered into a contract with Alabama Power with regard to the disposal of fuel from Plant Farley. See ECF No. 141 at 1-2. In this phase of litigation, Alabama Power seeks damages to cover costs it alleges were incurred, due to the government's partial breach of the Standard Contract from January 1, 2011, through December 31, 2014. See ECF No. 17 at 1; ECF No. 141 at 2.

¹⁰ The court notes that these additional engineering costs differ materially from plaintiff's delay in making repairs to the crane. In either the actual or non-breach worlds, plaintiff needed a functional crane and had sufficient notice of when Plant Vogtle would need to use it. To the contrary, plaintiff would not have needed a dry storage program had defendant performed under the contract.

During that time, Alabama Power incurred costs related to Plant Farley's dry cask storage program including damages for price adjustments to its contract with Holtec as a result of excess inventory, and additional costs related to the procurement and loading of Holtec casks. See ECF No. 224 at 39-54. Alabama Power's alleged damages for these categories are as follows:

Contract Price Adjustment:	\$742,903.92
Costs Related to Procurement and Loading	
Seismic Restraint Hardware:	\$1,007,358.28
Holtec Storage Fees:	\$274,495.57
Loading Campaign Delay Charges:	\$1,964,500.00
Total:	<u>\$3,989,257.77</u>

See ECF No. 224 at 26. The court will address each category, in turn.

1. Holtec Contract Price Adjustment

Pursuant to Alabama Power's contract with Holtec, it must order storage casks well in advance of—at least two years before—the loading campaign in which they will be used. See ECF No. 163 at 60-62 (Tr. 274:7-275:3, 275:17-276:9 (Channell)); see also id. at 54-55 (Tr. 268:21-269:15 (Channell) (testifying that plaintiffs generally schedule loading campaigns two years in advance)). Plaintiff intended to conduct loading campaigns at Plant Farley in 2009, 2011, and 2012. See id. at 55 (Tr. 269:16-22 (Channell)). The 2009 campaign, in which plaintiff planned to load seven casks, was canceled due to incomplete but necessary work on the forced helium dehydration system and the press of other work at the plant. See id. at 55-56, 62 (Tr. 269:23-270:12, 276:13-14 (Channell)).

At the time of cancellation, Alabama Power had already ordered casks for all three loading campaigns, twelve of which had not yet been delivered. See id. at 56 (Tr. 270:13-24 (Channell)). Plaintiff loaded two casks in 2010, but due to the 2009 campaign cancellation, the plant had an excess of casks on site. See id. at 65 (Tr. 279:20-24 (Channell)). Plaintiff worked with Holtec to delay the delivery schedule of the remaining twelve casks, and as a result, incurred \$742,903.92 in price increases under its contract. See id. at 66-69 (Tr. 280:17-283:2 (Channell)); see also ECF No. 141 at 3-4; ECF No. 141-1 ("Farley Holtec Contract Price Increases"). The delay also had the effect of "free[ing] up capital resources that [plaintiff] would have had to otherwise commit unnecessarily," ECF No. 163 at 70 (Tr. 284:21-24 (Channell)), which limited costs passed through to ratepayers at that time, see id. at 72 (Tr. 286:1-3 (Channell)).

Alabama Power first argues that defendant's breach caused the damages at issue because plaintiff "would never have needed to deal with an excess inventory of HI-

STORM cask systems had the [g]overnment simply performed under the Standard Contract.” ECF No. 224 at 41. Next, plaintiff contends that by challenging the damages, defendant “ignores the positive impact [of] delaying delivery of those HI-STORM cask systems had on the capital budget for Plant Farley.” Id. Plaintiff further explains that had it opted to store the extra casks on site, its acceptance of the casks would have triggered the accrual of costs and finance charges that would be passed on to ratepayers. See id. at 41-42 (citing ECF No. 163 at 72 (Tr. 286:1-3 (Channell))). Plaintiff sought to avoid triggering those costs because they “are not recoverable in these SNF cases because they are considered to be interest charges.” Id. at 42 (citing S. Cal. Edison Co. v. United States, 93 Fed. Cl. 337, 363 (2010) (holding that claims for this type of finance charge are barred by the “no interest rule” under 28 U.S.C. § 2516)).

Defendant argues that Alabama Power cannot recover the cost of adjusting its contract with Holtec because it, in effect, “misplaced” its duty to mitigate damages, which runs to defendant, not to its ratepayers. ECF No. 229 at 25. In addition, defendant contends that plaintiff unreasonably chose to adjust its contract with Holtec to delay cask delivery without conducting an analysis of the costs to do so relative to the alternative of storing the extra casks on the ISFSI pad or canceling the contract. See id. At trial, Mr. Brewer testified that plaintiff had “ample” space on the Plant Farley ISFSI pads, and in fact had stored empty equipment there in the past. See ECF No. 229 at 23 (citing ECF No. 173 at 140-43 (Tr. 2197:2-2199:6, 2199:12-2200:18 (Brewer))). The court agrees that more information was required to inform the reasonable course in this case.

Alabama Power is not required under the law to make the best choice in mitigating damages, but it is required to make a reasonable choice. See Indiana Michigan, 422 F.3d at 1375 (holding that a non-breaching party is obligated to mitigate its damages when “a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage”). In the court’s view, plaintiff did not demonstrate at trial that it had evaluated, in sufficiently specific terms, the financial impact of storing the extra casks on the ISFSI at Plant Farley as opposed to delaying delivery. The court understands and appreciates plaintiff’s desire to protect its rate payers from taking on additional costs in the form of unrecoverable finance charges. For the court to deem reasonable the election to delay cask delivery, however, a more detailed understanding of the obvious and available alternatives is required.

Accordingly, because plaintiff has not presented sufficient facts to support a finding that its mitigation decision was reasonable, Alabama Power is not entitled to recover the cost of the contract increases of \$742,903.92. See ECF No. 141-1 (“Farley Holtec Contract Price Increases”).

2. Costs Related to Procurement and Loading

After canceling the 2009 loading campaign, Plant Farley loaded two HI-STORM systems in 2010. See id. at 73-74 (Tr. 287:19-288:1 (Channell)). The plant then conducted another loading campaign in 2011 in order to avoid an adverse impact on operations due to small spent fuel pool margins. See id. at 113, 145-46 (Tr. 327:4-7, 359:10-360:11 (Channell)); see also id. at 220 (Tr. 434:4-8 (Channell) (testifying that the plant would not have been under the “same pressure” to load casks in 2011 had the 2009 campaign gone forward”)); DX 173A at 146:24-147:1 (Mr. Channell testifying that when the 2009 campaign was canceled, “it was already known that [Plant Farley] would lose core offload capability” as a result). The loading campaign was scheduled to begin in late February 2011. See ECF No. 163 at 74 (Tr. 288:6-11 (Channell)). Necessary modifications to the forced helium dehydration system caused a two-week delay, but the campaign ultimately began in March 2011. See ECF No. 163 at 74-76 (Tr. 288:12-21, 289:10-14, 290:7-19 (Channell)).

As the loading campaign began, Alabama Power received a copy of a report issued by the NRC to the Perry Nuclear Plant in Ohio. See JX 41. The NRC had determined that the configuration at Plant Perry required lateral seismic restraints to ensure the stacked equipment did not tip. See id. at 4. Despite the fact that Plant Perry used the same stack-up configuration during loading as Plant Farley, Alabama Power concluded that the new requirement did not apply to Plant Farley and continued with the loading campaign. See ECF No. 163 at 80-81, 85 (Tr. 294:25-295:2; 299:19-20 (Channell)). Shortly thereafter, the NRC notified Alabama Power that it must stop the loading campaign or risk the issuance of a willful violation of its regulations. See id. at 85 (Tr. 299:21-24 (Channell)).

Plant Farley immediately stopped the loading campaign. See id. at 87 (Tr. 301:9-10). The plant incurred significant costs related to the delay and the procurement of seismic restraints because of this series of events.

a. Seismic Restraint Hardware

As a result of the conclusions reached by the NRC regarding the need for seismic restraints, Alabama Power sent a letter in April 2011 to the NRC explaining its disagreement with its conclusions that a freestanding stack-up configuration was not permitted absent prior approval pursuant to 10 C.F.R. Part 72. See PX 77. At the same time, however, plaintiff proceeded with designing and procuring adequate seismic restraints to hedge against the possibility that the disagreement with the NRC would not be resolved before loading became imperative to the operation of Plant Farley. See ECF No. 163 at 88, 95, 97-98, 147, 150-55, 158 (Tr. 302:13-18, 309:20-22, 311:23-312:9, 361:14-25, 364:6-369:1, 372:18-25 (Channell)).

In June 2011, the NRC responded to Alabama Power's letter and provided certain conditions under which Plant Farley would be permitted to continue loading without seismic restraints. See JX 25. Alabama Power concluded that such conditions were met, and continued the loading campaign without the restraints. See ECF No. 163 at 107, 112, (Tr. 321:5-13, 326:6-22 (Channell)). Alabama Power incurred \$1,007,358.28 in design and fabrication costs related to the seismic restraints hardware that it ultimately did not need. See ECF No. 141-1 ("Farley Seismic Restraint Hardware").

As an initial matter, plaintiff argues defendant's breach caused it to incur the damages for seismic restraints related to the stack-up operation because, as Mr. Brewer testified, "[i]n the but-for world, there would be no stack-up." ECF No. 224 at 48; ECF No. 174 at 55 (Tr. 2378:21-22 (Brewer)). Plaintiff further contends that:

[b]ecause there was no guarantee that the NRC would agree with [plaintiff's] position that there were no regulatory issues with the freestanding stack-up configuration at Plant Farley, it was not only reasonable, but also absolutely necessary for [plaintiff] to also pursue seismic restraints in order to ensure that it could complete its dry cask loading campaign ahead of the 2011 and 2012 refueling outages.

ECF No. 224 at 48. If plaintiff had been unable to load fuel prior to the planned outages, it would not have had space in the spent fuel pool to prepare the new fuel. In that case, it would have had to "load new fuel directly from the new fuel vault into the reactor core." Id. (citing ECF No. 163 at 147-48, 150-55 (Tr. 361:23-362:25, 364:6-369:1 (Channell))). Doing so would be time-consuming and expensive, and thus was unreasonable and not plaintiff's practice. See id. (citing ECF No. 163 at 158 (Tr. 372:18-25 (Channell))).

Defendant insists that plaintiff should not recover the costs of the seismic restraints because plaintiff's "urgent need to load casks in 2011 was the result of [the] business decision" to cancel the 2009 loading campaign.¹¹ ECF No. 229 at 26; see also ECF No. 163 at 55-56, 62 (Tr. 269:23-270:12, 276:13-14 (Channell)). A 2009 loading campaign would have alleviated some of the pressure of the 2011 loading campaign. See ECF No. 229 at 27 (citing ECF No. 163 at 220 (Tr. 434:4-8 (Channell))). Defendant argues that because plaintiff did not justify at trial the reasonableness of the decision to

¹¹ Defendant also argues that the need to conduct the 2011 loading campaign was not as critical as plaintiff suggests. See ECF No. 229 at 29. Mr. Brewer testified that plaintiff would have had the space to "pre-wet" eight of the sixty-eight assemblies even without the 2011 campaign. ECF No. 173 at 153 (Tr. 2210:4-10 (Brewer)). Because such an approach would result in plaintiff loading a considerable majority of the new fuel directly into the reactor core, it does not adequately address plaintiff's concerns. See ECF No. 232 at 23 (explaining why loading fuel directly into the reactor core is an unreasonable option).

cancel the 2009 campaign, defendant should not be liable for the need to procure seismic restraints in 2011. See ECF No. 229 at 29-30.

In the court's view, defendant's focus is misplaced. The issue before the court is whether plaintiff's approach to resolving the NRC's concerns—which arose unexpectedly on the eve of an important loading campaign—was reasonable, not whether plaintiff's decision to cancel the 2009 loading campaign was reasonable.

The evidence demonstrates, by a preponderance of the evidence, that: (1) plaintiff's dry storage program was necessitated by defendant's breach, (2) the 2011 loading campaign was critical to Plant Farley's continued operation, (3) the NRC's concerns about the stack-up operation were unforeseeable prior to the beginning of the loading campaign, and (4) plaintiff responded reasonably in pursuing multiple paths to resolving the NRC's concern while ensuring the critical loading campaign would be successful.

Accordingly, Alabama Power is entitled to recover \$1,007,358.28 in design and fabrication costs related to the seismic restraints at Plant Farley. See ECF No. 141-1 ("Farley Seismic Restraint Hardware").

b. Holtec Storage Fees

Due to the delay in resolving the NRC's concerns, Plant Farley ultimately loaded three casks rather than the seven or eight it had initially planned to load in 2011, and a number of unused HI-STORMs remained stored on the fabrication pad at the plant. See ECF No. 163 at 159-60 (Tr. 373:8-374:11 (Channell)). Alabama Power, therefore, could not store the additional casks it had ordered for the previously scheduled 2012 loading campaign, delayed the delivery until 2013, and paid Holtec to store the casks until then. See id. at 161 (Tr. 375:5-12 (Channell)). The storage costs amounted to \$274,495.57. See ECF No. 141-1 ("Farley Holtec Storage Fees").

In discussing this issue, the parties largely refer back to the arguments they asserted with regard to the 2010 Holtec contract price adjustment for delayed cask delivery. Plaintiff argues that the financial benefit to ratepayers justified the decision to pay Holtec to store the casks rather than accept delivery, see ECF No. 224 at 49-50, ECF No. 232 at 24-25; and defendant argues that plaintiff's decision was unreasonable because it failed to fully consider the options, see ECF No. 229 at 30-32.

However, one notable difference is here, Alabama Power quantified the cost of storing the casks on the ISFSI pad, stating that it "viewed incurring those costs as more reasonable than paying the roughly \$2 million to \$4 million in final milestone payments and then beginning to incur [Allowance for Funds Used During Construction (AFUDC)] and other carrying costs on those capital assets." ECF No. 224 at 50. This is precisely

the sort of information the court finds useful in evaluating the reasonableness of plaintiff's decision. In this instance, however, the court cannot credit the comparison because neither the estimated milestone payments nor the other finance charges are supported by citation to the record.

Accordingly, because Alabama Power has not established sufficient facts to demonstrate that its mitigation decision was reasonable, it is not entitled to recover \$274,495.57 for storage costs. See ECF No. 141-1 ("Farley Holtec Storage Fees").

c. Loading Campaign Delay Charges

Plant Farley incurred delay charges related to the 2011 loading campaign for two reasons. First, the loading campaign was initially scheduled to begin on February 28, 2011, but was delayed until March 15, 2011, as a result of necessary work to the forced helium dehydration system. See ECF No. 163 at 74 (Tr. 288:6-289:19 (Channell)). Alabama Power wanted to complete the work while the loading campaign began, but Holtec objected to that plan and insisted that the work be done first. See id. at 75 (Tr. 289:10-14 (Channell)); see also id. at 209 (Tr. 423:13-21 (Channell)) (noting that while Holtec insisted that the forced helium dehydration skid work was done prior to loading, it was Alabama Power's responsibility to complete the work). This delay resulted in an upward price adjustment on Alabama Power's contract with Holtec in an amount of \$227,370. See id. at 213 (Tr. 427:4-7 (Channell)); DX 61.

Second, after the loading campaign began, the NRC's concerns caused further delay. See ECF No. 163 at 87 (Tr. 301:5-10 (Channell)). Loading casks in 2011 was "absolutely essential" ahead of planned outages in 2011 and 2012. See id. at 113 (Tr. 327:4-7 (Channell)). If Plant Farley were unable to load casks in 2011, it would have been forced to take actions that would extend outages, thereby either decreasing revenue or increasing generation costs. See id. at 155-57 (Tr. 369:24-371:19 (Channell)). Because the loading campaign was critical, Alabama Power believed that it needed to ensure that the crew scheduled to conduct it would be available as soon as it could proceed. See id. at 170-71 (Tr. 384:23-385:7 (Channell)). As such, Alabama Power retained the crew on-site while it resolved the NRC's concerns to prevent that crew from being reassigned to another campaign and becoming unavailable when Plant Farley was ready to proceed with loading. See id.; see also id. at 171-72 (Tr. 385:13-386:4 (Channell)). Plaintiff's concern that releasing the crew would unduly extend the delay was not confirmed, but rather was a "general understanding" of the state of the industry. See DX 173A at 171:24-172:7. The crew was ultimately retained but idle for approximately three months. See ECF No. 224 at 53. Combined with the initial delay costs, Alabama Power incurred delay-related costs of \$1,964,500. See ECF No. 141-1 ("Farley NRC Regulatory Concern Loading Campaign Delay Charges").

Alabama Power presents the first delay charge as a result of an unremarkable disagreement between plaintiff and Holtec. Plaintiff explains that it intended to make the necessary repairs to the forced helium dehydration system “in parallel with the start of the loading campaign, but Holtec ‘wanted to ensure that that was completed before we actually began loading, so we took a two-week [delay] to ensure that those modifications were complete, and then we began loading two weeks later.’” ECF No. 224 at 51 (citing ECF No. 163 at 75 (Tr. 289:10-14 (Channell))).

Defendant argues that plaintiff should not recover costs for the first delay for two reasons. First, as plaintiff acknowledges, it was plaintiff’s responsibility to complete the repairs. See ECF No. 229 at 34-35. And second, as Mr. Channell testified, Holtec’s request that the repairs be completed before loading began was reasonable. See id. at 35. In the court’s view, neither of these facts necessarily renders unreasonable plaintiff’s initial plan to complete the repairs while the loading campaign began. Absent evidence that Holtec’s request was more than an alternative, reasonable proposal that required plaintiff to complete a discrete and relatively brief task, defendant has not demonstrated that the delay charges were unreasonably incurred and therefore unrecoverable. See Entergy Nuclear, 95 Fed. Cl. at 184 (stating that, to demonstrate plaintiff is not entitled to mitigation damages, defendant must show that plaintiff’s efforts were unreasonable).

Alabama Power’s explanation for its decision to incur the second delay charge, however, is less persuasive. Plaintiff argues that it reasonably chose to retain the idle Holtec loading crew indefinitely in the hope of getting an NRC decision regarding the stack-up operation “sooner [rather] than later,” due to the critical nature of the 2011 loading campaign. See ECF No. 232 at 26 & n.11 (quoting ECF No. 163 at 171-72 (Tr. 385:13-386:4 (Channell))). As with the storage fees the court has previously addressed, plaintiff made no effort discernable from the record to evaluate or compare options before indefinitely retaining the Holtec crew. Instead, it appears that plaintiff acted out of concern that it would not be able to re-schedule the same experienced crew based on a “general understanding” of the state of the industry. See DX 173A at 171:24-172:7. Mr. Channell testified in his deposition that plaintiff did not discuss the circumstances with Holtec or rely on any documented information about the relevant labor market. See id. at 172:8-22.

In the court’s view, it was unreasonable for plaintiff to incur delay charges for an open-ended amount of time—which ultimately amounted to \$1,737,130—on the basis of only a general impression of the state of the labor market.

Accordingly, Alabama Power is entitled to recover \$227,370 for the cost of the first delay charge. See ECF No. 163 at 213 (Tr. 427:4-7 (Channell)); DX 61. But because plaintiff has not established sufficient facts to demonstrate that its decision to indefinitely retain the idle Holtec crew was reasonable, Alabama Power is not entitled to recover the remaining \$1,737,130 for delay charges.

D. Fleet Issues Related to Plants Hatch, Vogtle, and Farley

Plaintiffs also claim damages that are not specific to one plant, including: (1) internal labor costs for daily vent inspections; and (2) instrument tube tie rod (ITTR) repairs.

1. Internal Labor Costs Related to Daily Vent Inspection

Plaintiffs store spent nuclear fuel in multi-purpose canisters, or MPCs, which are in turn stored in HI-STORM 100 overpacks on ISFSI pads. See ECF No. 224 at 171. Each overpack has four vents to allow air to circulate around the MPC and regulate temperature. See ECF No. 163 at 266 (Tr. 480:23-25 (Martin)); id. at 18-19 (Tr. 232:16-233:8 (Channell)). The technical specifications require that plaintiffs monitor the vents for proper cooling and airflow at least once every twenty-four hours. See id. at 179, 184 (Tr. 393:5-13, 398:7-15 (Channell)). Although such monitoring may be accomplished either by visual inspection or electronic monitoring, plaintiffs conduct visual inspections because they consider such inspections to be more reliable. See id. at 180-81 (Tr. 394:16-395:10 (Channell)).

Plant personnel perform the daily visual inspections of the overpacks as part of outside rounds at each site. See id. at 181 (Tr. 395:8-15 (Channell)). While the outside rounds included other tasks, the vent inspections involved a defined process, which Mr. Martin explained as follows:

[W]hen you do a vent inspection, it is not just the time in the ISFSI, observing the vents to make sure they're clear of blockage. There are special characteristics of a nuclear power plant that make you sign into radiation work permits. There's more than just being inside the ISFSI, the independent spent fuel storage installation. There's a process of getting there, going through the right processes, to be able to access the ISFSI, and then doing the vent inspection and then going back through the back end of the process, to be able to perform the vent inspection.

Id. at 269-70 (Tr. 483:25-484:10 (Martin)). Despite this defined process, however, plant personnel who conduct the inspections do not track the time spent doing so separately from the other tasks performed during rounds. See id. at 183 (Tr. 397:7-14 (Channell)). At Plant Vogtle and Plant Farley, the inspections were performed twice per day, and at Plant Hatch, the inspections were performed once per day. See id. at 181-82, 184-85 (Tr. at 395:16-396:2, 398:16-399:5 (Channell)).

Because the time is not separately tracked, plaintiffs estimated the costs associated with the vent inspections. Mr. Channell conferred with the plant personnel who perform the inspections and they estimated that the inspections take “roughly 45 minutes per day

to go through the process of getting the paperwork, going out to the ISFSI, doing the inspections, completing the paperwork, and moving on to the next test.” Id. at 186 (Tr. 400:9-19 (Channell)). Based on his knowledge of plant operations and geography, Mr. Channell considered the forty-five-minute estimate to be “reasonable.” Id. at 198-99 (Tr. at 412:11-413:3 (Channell)).

Mr. Martin also personally observed vent inspections at each plant and tracked the required time. See id. at 265 (Tr. 479:20-21 (Martin)); see also PX 141, PX 143, PX 144, and PX 145. The process observed by Mr. Martin included: (1) visiting the Radiation Protection office to collect safety equipment and required paperwork, see id. at 281-82 (Tr. 495:2-24, 496:13-17) (Martin)); ECF No. 164 at 14-16, 27, 30 (Tr. 533:19-534:4, 534:20-535:5, 546:3-12; 549:1-4 (Martin)); (2) travelling to the ISFSI at each plant, on foot at Plants Vogtle and Farley, see id. at 19, 28 (Tr. 538:5-10, 547:11-13 (Martin)), and by vehicle at Plant Hatch,¹² see ECF No. 163 at 289 (Tr. 503:5-13 (Martin)); (3) visually inspecting the casks, see id. at 294 (Tr. 508:2-11) (Martin)); ECF No. 164 at 22, 29 (Tr. 541:4-12, 548:7-11 (Martin)); (4) conducting a check for contamination upon exiting the ISFSI pad, see PX 145; (5) returning to the Radiation Protection office, id.; and (6) passing through personnel contamination monitors in the Radiation Protection offices, see id.; ECF No. 163 at 296 (Tr. 510:5-18 (Martin)).

The plant personnel who performed inspections at Plant Hatch earned hourly rates during the damages period at issue as follows: \$33.56 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See PX 138 at 4; see also ECF No. 224 at 143. The plant personnel who performed inspections at Plant Vogtle earned hourly rates during the damages period at issue as follows: \$33.56 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See id. at 5. And the plant personnel who performed inspections at Plant Farley earned hourly rates during the damages period at issue as follows: \$32.15 in 2011; \$36.37 in 2012; \$37.28 in 2013; and \$38.40 in 2014. See id. at 3.

Plaintiffs estimate that they have incurred damages in an amount of \$143,189.44 for vent inspections, divided between plants as follows: (1) \$39,860.74 at Plant Hatch; (2) \$24,379.20 at Plant Vogtle; and (3) \$78,949.50 at Plant Farley. See ECF No. 224 at 151; see also ECF No. 170 at 65 (Tr. 1722:2-13 (Metcalf)). Plaintiffs’ expert Mr. Metcalfe, testified that:

to arrive at the sum total of damages, . . . [he] took the number of hours that Plaintiffs estimated it took to perform vent inspection activities each time they were performed and then multiplied that number by (1) the number of inspections per day and (2) the number of days per year to arrive at the

¹² The more remote ISFSI at Plant Hatch required additional security measures both before and after inspections. See ECF No. 163 at 290, 294, 295 (Tr. 504:18-20, 508:17-25, 509:13-19 (Martin)); see also PX 145.

number of manhours per year Plaintiff estimated it took to perform vent inspection activities at each of their plants.

ECF No. 224 at 144 (citing ECF No. 170 at 93-94 (Tr. 1750:13-1751:6) (Metcalf))). That number was then multiplied by the applicable hourly rate for each plant in each year. See id. (citing ECF No. 170 at 94 (Tr. 1751:7-15 (Metcalf))).

During his inspection observations, Mr. Martin observed that vent inspections at Plant Hatch took 1.17 hours, at Plant Vogtle took 37 minutes, and at Plant Farley took 40 minutes. See id. at 150 (citing ECF No. 164 at 38, 39 (Tr. 557:5-7, 558:1-3, 558:7-9 (Martin))). Based on these estimates, Mr. Martin calculated the cost of vent inspections at the three plants for the damages period at \$184,000. See id. (citing ECF No. 164 at 40 (Tr. 559:8-17 (Martin))). According to Mr. Channell, however, plaintiffs chose not to revise their original estimates so as to “not be at risk of over-claiming what the time was.” Id. (citing ECF No. 163 at 200 (Tr. 414:23-25 (Channell))).

Defendant does not deny that its breach caused plaintiffs to incur these costs; rather, defendant challenges plaintiffs’ damages estimates. See ECF No. 173 at 255 (Tr. 2312:17-25 (Brewer)); ECF No. 229 at 99-102. Defendant criticizes both the need for estimates and the method for arriving at them. According to defendant, “[d]espite knowing that they would inevitably seek to recover costs for conducting these inspections, plaintiffs chose not to track their actual time and cost.” ECF No. 229 at 99. Defendant attacks the initial forty-five-minute estimate as “unreliable,” id., and then attempts to undermine the credibility of Mr. Martin’s observations meant to verify the reasonableness of the initial estimate, see id. at 100, 102. In particular, defendant takes issue with Mr. Martin’s failure to compare the number of casks at each plant at the time of his observations with the number present during the claims period. See id. It also criticizes plaintiffs’ practice at Plants Vogtle and Farley of conducting two inspections per day rather than one, as required by the storage cask licenses. See id. at 101.

As a starting point, plaintiffs correctly argue that estimates are an acceptable basis for their recovery. See ECF No. 224 at 146. As the Federal Circuit has held, “where responsibility for damage is clear, it is not essential that the amount thereof be ascertainable with absolute exactness or mathematical precision.” Nat’l Australia Bank v. United States, 452 F.3d 1321,1327 (Fed. Cir. 2006) (quoting Bluebonnet, 266 F.3d at 1355. Instead, “the court’s duty is to make a fair and reasonable approximation of the damages.” Bluebonnet, 266 F.3d at 1356-57 (internal citation omitted).

To verify the reasonableness of the forty-five-minute estimate on which plaintiffs first proceeded, plaintiffs asked Mr. Martin to personally observe vent inspections and keep careful notes of the associated activities and the time required to perform them. See ECF No. 224 at 147 (citing ECF No. 163 at 265 (Tr. 479:20-21 (Martin))). Mr. Martin

observed inspections at each of the three plants and simultaneously recorded notes on the process. See PX 141, PX 143, PX 144, and PX 145.

In the court's view, plaintiffs' approach to developing estimates for information they did not otherwise separately track in the normal course of their operations was deliberate and rational. Defendant criticizes Mr. Martin's process because it did not account for every variable between the time of his observations and the claims period. See ECF No. 229 at 99-102. "Absolute exactness or mathematical precision," however, is not the standard by which estimates are judged. Nat'l Australia Bank, 452 F.3d at 1327. The court finds that plaintiffs estimates based on Mr. Martin's personal observations, allow the court to "make a fair and reasonable approximation of the damages" suffered by plaintiffs. Bluebonnet, 266 F.3d at 1356-57.

In addition, the court sees no reason to penalize plaintiffs for their decision to conduct multiple daily inspections at Plants Vogtle and Farley. Plaintiffs conducted the extra inspections "to ensure no inspection is missed within any given 24-hour period to avoid the harsh NRC penalties." ECF No. 232 at 77 (citing ECF No. 163 at 181-82, 184-85 (Tr. 395:16-396:2, 398:16-399:1, 399:6-17 (Channell))). Mr. Brewer characterized this decision as "similar to other things I have seen at nuclear plants where the requirement to do something once is good, and so they say, well, to make sure we don't do it wrong the first time or we don't miss it the first time, we'll do it a second time." Id. at 78 (citing ECF No. 173 at 120 (Tr. 2177:13-18 (Brewer))).

As this court has previously observed, "[n]uclear fuel storage is inherently a sensitive and expensive endeavor." Yankee Atomic, 113 Fed. Cl. at 333. The court further acknowledges that companies engaged in the endeavor are run by human beings capable of making mistakes, and does not fault plaintiffs for attempting to build confidence into their systems in this way. Defendant has not demonstrated that plaintiffs acted unreasonably by conducting more vent inspections than required.

Accordingly, plaintiffs are entitled to recover damages in an amount of \$143,189.44 for vent inspections, divided between plants as follows: (1) \$39,860.74 at Plant Hatch; (2) \$24,379.20 at Plant Vogtle; and (3) \$78,949.50 at Plant Farley. See ECF No. 224 at 151; see also ECF No. 170 at 65 (Tr. 1722:2-13 (Metcalf)).

2. Instrument Tube Tie Rod Repairs

In May 2001, Westinghouse informed plaintiffs that certain fuel assemblies present at Plants Farley and Vogtle had a design defect. See ECF No. 224 at 151-52 (citing ECF No. 162 at 143 (Tr. 143:6-17 (Williams))); PX 116. Because the defect was first identified at the North Anna Nuclear Generating Station, assemblies with this defect are referred to as "North Anna fuel." See id. at 151 (citing ECF No. 169 at 7 (Tr.

1380:15-18 (Supko))). Westinghouse also notified plaintiffs at that time that it had developed a Nozzleless Handling Tool which could be used with the North Anna fuel:

Westinghouse has designed tools to handle 14x14, 15x15 or 17x17 fuel assemblies that do not have a top nozzle due to difficulties experienced during fuel repair. This tool can also be used to handle assemblies where the top nozzle is still present, yet the attachment of the top nozzle to the fuel assembly is suspect. . . . Refinements of this tool's design for the more frequent use anticipated with this nozzle separation issue are planned.

Id. at 152 (citing PX 116 at 11).

Plaintiffs inspected their North Anna fuel in 2002, 2003, and 2007. See id. (citing ECF No. 162 at 148 (Tr. 148:5-6 (Williams))). They used the NHT in the 2007 inspections. See id. (citing ECF No. 162 at 150 (Tr. 150:9-12 (Williams))). “While using the NHT in 2007, [plaintiffs’] personnel had to perform lengthy inspections of [part of the NHT], which had some associated radiation dose” with it. id. at 153 (citing ECF No. 162 at 149 (Tr. 149:10-15 (Williams))). In addition, “plaintiffs discovered that the NHT would not fully seat on top of North Anna type fuel assemblies . . . , and would begin having added difficulties after several moves that would require rebuilding the tool’s ‘gripper fingers.’” ECF No. 229 at 103 (citing DX 23). Mr. Loftin testified at trial that the rebuilds cost approximately \$50,000 each, in addition to the \$250,000 cost for the NHT itself. See ECF No. 224 at 153 (citing ECF No. 170 at 169 (1826:1-13 (Loftin))).

In 2008, Plant Farley began repairing the ITTRs on the North Anna fuel in order to better facilitate handling assemblies with a standard fuel handling tool rather than the NHT. See id. (citing ECF No. 162 at 135, 150 (Tr. 135:9-16, 150:16-17 (Williams))). Plaintiffs were concerned about the ability to move assemblies before and after refueling outages to ensure that plaintiffs were meeting “certain criticality (or heat load) requirements that are required by its NRC licenses.” Id. at 154 (citing ECF No. 162 at 150, 184 (Tr. 150:18-23, 184:2-7 (Williams))), ECF No. 169 at 129 (Tr. 1502:6-21 (Supko))). Because the DOE had failed to perform under the Standard Contract, the pools were full, and “it became very difficult to . . . manage the spent fuel pools at the plants.” ECF No. 162 at 150-51 (Tr. 150:24-151:3 (Williams)). This resulted in the need to move fuel frequently, which lead Plant Farley to make permanent ITTR repairs. See id. The permanent repairs improve the ability to handle the fuel both in the pools, when loaded into dry casks, and potentially back into the pools when the DOE does perform. See id. at 158 (Tr. at 158:4-11 (Williams)). For the same reasons, Plant Vogtle decided to make permanent ITTR repairs. See id. at 159-60 (Tr. 159:17-21, 160:2-12 (Williams))).

In March 2009, Westinghouse recommended that utilities discontinue use of the NHT in their spent fuel pools pending a technical review, see id. at 165 (Tr. 165:10-15

(Williams)), and on July 2, 2009, Westinghouse issued a technical bulletin in which it recommended that utilities stop using the NHT in operations such as dry cask loading, see JX 21 (Westinghouse Technical Bulletin).

After the inspections, Plant Farley loaded 148 assemblies suspected of having defects into dry storage. See ECF No. 162 at 174 (Tr. 174:5-9 (Williams)). Plant Farley prioritized loading North Anna fuel to avoid stress corrosion cracking that could contaminate the pool, and to avoid the need for continued inspection and moving of potentially damaged fuel. See id. at 183 (Tr. 183:2-13 (Williams)). Plant Farley had 980 suspect assemblies, see id. at 170 (Tr. 170:23 (Williams)), and Plant Vogtle had 193, see id. at 171 (Tr. 171:3 (Williams)). Plaintiffs argue that, in the non-breach world, the repairs would not have been necessary because they would have prioritized loading all suspect assemblies to the government and that they had sufficient allocations to do so prior to March 2009. See ECF No. 224 at 159-60; see also ECF No. 162 at 187 (Tr. 187:14-24 (Williams)) (asserting that plaintiffs had the authority to decide which fuel was loaded and when). In that case, plaintiffs “would have used the NHT (just as other utilities did) to pick the fuel up once and load them into DOE casks.” ECF No. 224 at 158 (citing ECF No. 162 at 174 (Tr. 174:5-7 (Williams)), ECF No. 169 at 9 (Tr. 1382:21-26 (Supko))).

At Plant Farley, 299 suspect assemblies were repaired with ITTRs during the claim period at issue, at a cost of \$1,047,905.50. See id. at 163 (citing ECF No. 162 at 174, 196 (Tr. 174:5-9, 174:21-24, 196:14-16 (Williams)); ECF No. 169 at 9 (Tr. 1382:10-13 (Supko)); ECF No. 170 at 69 (Tr. 1726:22-24 (Metcalf)); ECF No. 141-1 (“Farley and Vogtle Instrument Tub Tie Rod (‘ITTR’) Repairs”). At Plant Vogtle, 193 assemblies were repaired with ITTR during the claim period at issue, at a cost of \$1,952,708. See id. (citing ECF No. 162 at 175 (Tr. 175:9-12 (Williams)); ECF No. 170 at 69 (Tr. 1726:22-24 (Metcalf)); ECF No. 141-1. The total claim for ITTR repairs, then, is \$3,000,613.50. See id.

Ms. Supko testified at trial that plaintiffs “had enough acceptance rights at each plant to allow it to load all of its North Anna type fuel to the [g]overnment by March 2009—[the] date when Westinghouse recommended that nuclear utilities stop using the NHT.” ECF No. 224 at 158 (citing JX 21). From 2001 through 2008, Plant Farley had acceptance rights for 991 assemblies, and it had 980 suspect assemblies. See id. at 159 (citing ECF No. 169 at 15-16 (Tr. 1388:25-1390:24 (Supko))). From 2007 through 2008, Plant Vogtle had acceptance rights for 191 assemblies, and it had 193 suspect assemblies. See id. at 160 (citing ECF No. 162 at 171 (Tr. 171:3 (Williams)), ECF No. 169 at 18 (Tr. 1391:3-7 (Supko))). According to plaintiffs, Plant Vogtle would have loaded the remaining two suspect assemblies to the DOE at the beginning of 2009, a year in which it had acceptance rights for another 156 assemblies. See id. at 159-60.

Defendant challenges plaintiffs' version of the non-breach world, summarizing its position as follows:

the evidence at trial demonstrated that: (1) use of the NHT to load North Anna fuel assemblies to DOE would not have been allowed; and (2) even if it had been, the cost to plaintiffs of doing so would have exceeded the cost of making the ITTR repairs that they made in the actual world. And, even if the evidence had not demonstrated those facts by a preponderance of the evidence, plaintiff still would have failed to carry their burden on this issue as a matter of law, because plaintiffs failed to make any attempt to "prove the extent to which [their] incurred costs [for the ITTR repairs] differ from the costs [they] would have incurred in the non-breach world" for loading DOE casks using the NHT.

ECF No. 229 at 108-09 (quoting Energy Nw., 641 F.3d at 1306); see also S. Nuclear, 637 F.3d at 1304 ("As we held in Yankee Atomic, '[b]ecause plaintiffs . . . are seeking expectancy damages, it is incumbent upon them to establish a plausible 'but-for' world.'") (citations omitted).

In their reply, plaintiffs insist that the difference between costs to manage the North Anna fuel in the actual and non-breach worlds is "completely irrelevant and not part of Plaintiffs' burden." ECF No. 232 at 83. Plaintiffs, instead, claim that their burden here is "only to provide support for the costs it actually incurred to make the ITTR repairs." Id. The court disagrees. As part of their causation argument, plaintiffs must present a "comparison between the breach and non-breach worlds." Yankee Atomic, 536 F.3d at 1273. The plaintiff bears the burden of proving "the extent to which his incurred costs differ from the costs he would have incurred in the non-breach world." Energy Nw., 641 F.3d at 1306.

Even accepting plaintiffs' position that in the non-breach world they would have loaded the North Anna fuel to the DOE using the NHT, the evidence demonstrates that there would have been material costs associated with doing so. The costs, at minimum, would not have been zero. See ECF No. 170 at 169 (Tr. 1826:1-13 (Loftin)) (indicating that the cost of the NHT was \$250,000, and the tool required rebuilds after some period of use that cost approximately \$50,000 each). Plaintiffs, however, have not presented evidence of the specific costs that they would have incurred to purchase or rent the NHT at each plant or the costs to perform the necessary maintenance or rebuilds on the tool to load the North Anna fuel to the DOE in the non-breach world. Absent that information, the court cannot make the requisite comparison to support an award of damages to plaintiffs.

Accordingly, plaintiffs are not entitled to recover the \$3,000,613.50 for making ITTR repairs. See ECF No. 141-1 (“Farley and Vogtle Instrument Tube Tie (‘ITTR’) Repairs”).

E. Reduction for Allocation of Indirect Costs

At trial, defendant’s damages expert, Mr. Larry Johnson, sought “to reduce [plaintiffs’] damages claim by assigning an additional \$455,518 in ‘indirect costs’ to the categories of damages that the [g]overnment challenges.” ECF No. 224 at 163; see also id. at 164 (itemizing the categories for which Mr. Johnson allocated indirect costs); DDX G at 11 (defendant’s demonstrative exhibit displaying Mr. Johnson’s proposed allocated indirect costs).

Plaintiffs challenge Mr. Johnson’s allocation of indirect costs on several grounds. First, plaintiffs note that in making these allocations Mr. Johnson is attempting to re-create information that plaintiffs could have provided to defendant had it asked in discovery. See id. at 165. Second, plaintiffs assert that Mr. Johnson’s methodology is unsound and was not disclosed prior to his testimony at trial. See id. at 164 & n.91 And finally, plaintiffs argue that Mr. Johnson’s allocation of indirect costs conflicts with the facts in this case. Specifically, plaintiff states that “Mr. Johnson’s approach to indirect cost allocation, . . . is flagrantly inconsistent with Mr. Channell’s testimony, not representative of [plaintiffs’] normal accounting policies and procedures (as required under [Generally Accepted Accounting Principles] and [Federal Energy Regulatory Commission] regulations), and ignores inconsistencies like the actual time periods in which the costs were incurred.” Id. at 169.

The court agrees with plaintiffs. As an initial matter, the most reasonable way to reach an understanding of how indirect costs affect plaintiffs’ recovery is through stipulations or a cooperative and comprehensive discovery process. Defendant evidently did not ask effective questions in discovery, and plaintiff did not volunteer clarifying information. See id. at 165 (stating that plaintiffs “diligently responded to the [g]overnment’s requests for labor costs when the [g]overnment asked for the quantification,” and providing an example) (emphasis in original).

Perhaps the more fundamental problem with Mr. Johnson’s approach, however, is that the methodology he used divorces the indirect cost calculations from the specific projects at issue, and the methodology is not otherwise supported by any practice or authority. At trial, Mr. Johnson characterized his method as “a ‘formulaic expression’ to apply in circumstances where the ‘total amount of costs [related to a claim adjustment] would involve labor but not [already] include the labor.’” ECF No. 229 at 110 (quoting ECF No. 174 at 106-07 (Tr. 2429:25-2430:2 (Johnson))). Defendant explained the formula as follows:

First, a ratio is calculated between the direct cost of the adjustment and the total of all direct costs included in the claim. This fraction represents the proportional “relationship” between the direct cost of a particular adjustment and the total amount of all direct costs included in the claim. For example, if the direct cost of a given damages category was \$1 and the total of all direct costs included in the claim was \$10, then the particular category would represent 10% of all direct costs claims. The proportional relationship reflecting this ratio is then applied to the total applicable labor costs claimed, which allows the [g]overnment to estimate, through allocation, the amount of labor costs that are applicable to the direct costs of the adjustment.

ECF No. 229 at 110 (internal citations omitted). It is clear to the court that this formula is untethered from the facts in this case. It fails to address the manner in which plaintiffs kept their records or when particular costs were incurred. Absent a basis for concluding that such a generalized approach is meaningful in this context—which defendant has not provided in these cases—the court finds that defendant has failed to present evidence that the methodology is sufficiently reliable to reduce plaintiffs’ recovery. See Kumho Tire Co. v. Carmichael, 526 U.S. 137, 141 (1999) (explaining that the trial court is tasked with the “gatekeeper” function under Federal Rule of Evidence 702, to “ensur[e] that an expert’s testimony both rests on a reliable foundation and is relevant to the task at hand”) (internal citation omitted).

Accordingly, the court declines to reduce plaintiffs’ recovery through defendant’s theory of indirect cost allocation.

F. Defendant’s Offset Claim

The final damages issue in these cases is defendant’s request for “an offset of \$3,345,106 for the economic benefit, or profit, that plaintiffs obtained during the current claim period by including SNF storage capital assets in their respective profit-earning rate bases.” See ECF No. 223 at 7 (citing ECF No. 174 at 209 (Tr. 2532:10-15 (Cain)); ECF No. 178-65 at 3 (DDX Q at 3)).

Defendant is entitled to an offset against plaintiffs’ damages when plaintiffs have received a financial benefit as “a direct consequence of the government’s breach.” LaSalle Talman Bank, F.S.B. v. United States, 317 F.3d 1363, 1373 (Fed. Cir. 2003). Put another way, “[w]here the defendant’s wrong or breach of contract has not only caused damage but has also conferred a benefit upon plaintiff . . . which he would not have otherwise reaped, the value of this benefit must be credited to defendant in assessing the damages.” Id. at 1372. To recover for the offset, defendant must demonstrate a “fair and reasonable approximation of the damages.” Caroline Hunt Trust Estate v. United States, 65 Fed. Cl. 271, 330 (2005), aff’d in relevant part, rev’d on other grounds, 470 F.3d 1044 (Fed. Cir. 2006).

Plaintiffs’ “shareholders provide the equity capital that Alabama Power and Georgia Power require to run their utility operations.” ECF No. 230 at 5. That equity capital is used, in part, for projects such as the dry storage necessitated by defendant’s breach of the Standard Contracts. See id. Plaintiffs acknowledge that the shareholders who make such investments in infrastructure “get a return.” Id. According to plaintiffs, however, this return on investments should not be characterized as a profit for the companies, but rather as a cost for their customers. According to plaintiffs, “[s]hareholders who invest capital do indeed expect a return for the use of their money, but, from the standpoint of [p]laintiffs’ customers, that shareholder return is a cost the customers must pay for electric service.” Id.

The problem with plaintiffs’ theory is that, absent an offset for the amount of that return, it essentially puts defendant in the position of paying the return to plaintiffs’ shareholders. The court understands plaintiffs’ concern that its customers not bear the burden of that return, but as for-profit companies, plaintiffs are, in fact, in the position to avoid that outcome. As defendant argues, “[w]hether or not plaintiffs will return their SNF-related profits to their customers if the [c]ourt grants the [g]overnment its claimed offset is legally irrelevant to whether the United States is required to pay for it.” ECF No. 231 at 5-6. Plaintiffs have not provided either evidence or binding authority sufficient to persuade the court to the contrary view.¹³

The court finds that plaintiffs’ shareholders have received a financial benefit in the form of a return on their equity investments in plaintiffs’ dry storage infrastructure. Whether the benefit is characterized as a profit for shareholders or a cost to customers is a matter of, at most, plaintiffs’ internal accounting, and at least, semantics. See DX 175A at 66:6-67:20 (Alabama Power’s corporate representative testifying that in the context of “return on capital,” the concepts of “profit,” “net income,” and “cost of equity” are synonymous); ECF No. 175 at 40 (Tr. 2614:14-22 (Adams)) (Georgia Power’s corporate representative testifying that “[t]he cost of equity is also called net income,” and “represents what it is that we expect to pay to our equity investors through the dividends”); id. at 50 (Tr. 2624:12-15 (Adams)) (Georgia Power’s corporate representative agreeing that the terms “cost of equity” and “profit” are interchangeable).

¹³ Plaintiffs argue that the court should deny defendant’s offset claim for the same reason a reduction in recovery was denied by this court in Duke Energy Progress, Inc. v. United States, 135 Fed. Cl. 279 (2017). See ECF No. 230 at 9. In that case the court found that defendant’s requested offset was unrecoverable as too remote because it was dependent on “the result of lengthy, challenging, and contested state agency proceedings.” Duke Energy, 135 Fed. Cl. at 298 (internal quotation marks and citations omitted). The cases before the court involve no such complications in connecting defendant’s offset to its breach. Thus, the court finds Duke Energy inapposite.

Defendant seeks the following offsets, based on plaintiffs' quantification of returns on equity: (1) \$2,353,257 against Georgia Power's recovery, and (2) \$991,851 against Alabama Power's recovery.¹⁴ See ECF No. 223 at 12-15. The court finds that plaintiffs' calculations satisfy the requirement that defendant present a fair approximation of the amount at issue. See Caroline Hunt, 65 Fed. Cl. at 330. The court, however, understands these figures to be based on the damages sought by plaintiffs in these cases. See ECF No. 223 at 7. Because the court, in this opinion, does not award plaintiffs all requested damages, corresponding adjustments may be necessary to defendant's offset claim. To assist the court in entering accurate final judgments in these cases, the court will direct the parties to file a joint motion for entry of judgment based on the rulings herein.

IV. Conclusion

Accordingly, for the foregoing reasons:

- (1) On or before **July 14, 2023**, the parties are directed to **FILE** a **joint motion for entry of judgment** based on the rulings in this opinion; and
- (2) On or before **July 14, 2023**, the parties are directed to **CONFER** and **FILE** a **notice** attaching the parties' agreed upon redacted version of this opinion, with any competition-sensitive or otherwise protectable information blacked out.

IT IS SO ORDERED.

s/Patricia E. Campbell-Smith
PATRICIA E. CAMPBELL-SMITH
Judge

¹⁴ The court notes that defendant states the offset total it seeks as "\$3,345,106," ECF No. 223 at 7, but the breakdown it provides as between the plaintiffs—\$2,353,257 against Georgia Power's recovery and \$991,851 against Alabama Power's recovery, id. at 12-15—equals \$3,345,108. The court trusts that this discrepancy will be corrected when the parties apply this court's ruling to defendant's offset claims.